Mechanical Works (Carter)

Contents

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SECTION ONE - SCOPE OF WORKS

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1.01 - INTRODUCTION

The purpose of this manual, the manufacturers' technical literature and the record drawings is to offer the personnel concerned with the operation and maintenance of the mechanical and electrical services within the building maximum assistance in the performance of their duties.

The manual has been prepared on the assumption that a competent person will be charged with the responsibility of the mechanical and electrical services.

Although the manual functions as a complete entity, each section is self-contained and provides information on differing aspects of the installation. Familiarisation with all sections prior to formulating operating and maintenance programme will prepare the building management personnel for the occasions when a particular problem occurs.

It should be noted that a planned schedule of inspection and repair, together with familiarisation of the plant on site by the qualified Maintenance Personnel is the heart of a preventative maintenance programme.

The operating and maintenance recommendations provided in this manual are based on best industry practices. These are not designed to be a replacement for specific manufacturer’s recommendations. Further advice should be sought in the manufacturers O&M Manuals for specific conditions that may affect product or system warranty. Carter Electrical Services accept no liability for any loss, damage or personal injury associated with the recommendations in this manual.

Appointed Technical Authors

In this instance, End Systems Limited have been appointed as Technical Authors, working on behalf of Carter Electrical Services.

The role of End Systems Limited was to assemble and present O&M information gathered from 3rd parties, including literature, drawings and test certification into a concise pack of handover documentation.

1.02 - PROJECT DETAILS

Project Title:	Calder Park, Wakefield
Project Number:	P21-024
Month of Completion:	August 2022
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1.03 - GENERAL

The project with which this manual is concerned is designated Calder Park, Wakefield, and specifically details the new mechanical services installations.

The building is a four storey construction comprising of office and warehouse areas.

The installation consists of the following:-

a) Mechanical Ventilation Heat Recovery Systems

b) Extract Ventilation Systems

c) Air Conditioning Systems

d) Mains Cold Water Distribution

e) Domestic Hot Water Distribution

These services together with the associated utility services and controls installation, combine to form a totally integrated environmental system within the areas served.

The manual is designed to be read in conjunction with the record drawings and plant manufacturers' literature to provide maximum assistance to the personnel concerned with the successful operation and maintenance of the mechanical services installation.

1.04 - VENTILATION & AIR CONDITIONING SYSTEMS

1.04.01 - Mechanical Ventilation Heat Recovery Units (MHVR.01 - 04)

A series of mechanical ventilation heat recovery units have been installed to provide the fresh air supply, extract and heat recovery ventilation to the building.

Each MVHR unit comprises of panel filters on both the supply and extract components, plate heat exchangers, and supply and extract fans.

Outside air is drawn into the unit via an MVRH inlet louvre, the air is then drawn through the MVHR unit, where it is conditioned to the dictates of the control system, before being passed into the supply distribution system.

From each unit, the supply ductwork runs within the ceiling voids with branch ductwork connections taken at relevant locations to distribute the conditioned air to serve the fan coil units located within each open plan office and meeting/breakout areas throughout each floor, as detailed in 1.04.04.

Extract air is drawn from each area served by way of an extract bellmouth, drawing the air into the extract ductwork running within the ceiling voids and back to the MVHR unit.

As the extract air passes through MVHR unit, heat energy is transferred to the supply air stream via the unit's plate heat exchanger. After passing through the MVHR unit, the extracted air is ducted to be discharged to atmosphere by way of an MVHR exhaust louvre.

For further information on MVHR operation and temperature control, reference should be made to the manufacturer's literature located within Section 04 - Data Sheets.

Airborne noises are attenuated at source by duct mounted silencers on the inlet and discharge of the air handling unit, in order to achieve the required design noise criteria.

Volume control dampers are installed at various points within the ductwork to enable the correct system air balance to be achieved. Once the system has been commissioned, these dampers should not be adjusted.

For technical information on the MVHR units, refer to the manufacturer's literature within Section 04 - Data Sheets.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.04.02 - Toilet Extract Ventilation Systems (EF.01)

Extract ventilation is provided to each WC located on each floor throughout the building, by way of a twin fan unit, located at high level on the third floor.

Extract air is drawn from each area served, by way of a series of ceiling mounted extract grilles, before passing into a range of extract ductwork running within the ceiling voids, back to the extract fan.

After passing through the extract fan, the extracted air is discharged to atmosphere via an exhaust louvre.

The extract fan is operated and controlled via light switch operation, complete with a speed controller.

Airborne noises are attenuated at source by duct mounted silencers on the inlets and discharge of the extract fan, in order to achieve the required design noise criteria.

Volume control dampers are installed at various points within the ductwork to enable the correct system air balance to be achieved. Once the system has been commissioned, these dampers should not be adjusted.

For technical information on the extract fan, refer to the manufacturer's literature within Section 04 - Data Sheets.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.04.03 - Dock Tower Toilet Extract Ventilation Systems (EF.02)

Extract ventilation is provided to the Ground Floor WC's, by way of an in-line duct mounted fan unit.

Extract air is drawn from each area, by way of a series of ceiling mounted extract grilles, before passing into a range of extract ductwork running within the ceiling voids, back to the extract fan.

After passing through the extract fan, the extracted air is discharged to atmosphere via an exhaust louvre.

The extract fan is operated and controlled via light switch operation, complete with a speed controller.

For technical information on the extract fan, refer to the manufacturer's literature within Section 04 - Data Sheets.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.04.04 - Fan Coil Units

A series of fan coil units have been installed throughout the building to provide closer controls of the temperatures within each area served.

The full schedule and performance data of the fan coil units installed can be found within the manufacturer's information within Section 04 - Data Sheets.

The fan coil units are provided with primary air from the respective area's mechanical ventilation heat recovery unit, which is drawn into the fan coil unit where it is conditioned to the local temperature requirements before being discharged into the space.

The fan coil units are operated and controlled via local wall mounted controllers installed within each area served.

For technical information on the fan coil units, refer to the manufacturer's literature within Section 04 - Data Sheets.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.04.05 - Dock Tower Air Conditioning Systems

2No. fan coil cassette units have been installed on each floor of the Dock Tower, to provide the air conditioning requirements to each area served.

Each indoor air conditioning units are duct mounted units, of which are both interlinked via refrigerant pipework to their associated condensing units, located externally.

Each of the condensing units are a reverse heat pump type, capable of heating or cooling the air off the internal air conditioning units.

The air conditioning units are operated and controlled via a local wall mounted controller installed within each area served.

For technical information on the air conditioning units, refer to the manufacturer's literature within Section 04 - Data Sheets.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.05 - ELECTRIC HEATING

1.05.01 - Electric Panel Heaters

Electric panel heaters have been installed within the WC's throughout the building to provide the heating requirements of the building.

For technical information on the electric panel heaters, refer to the manufacturer's literature within Section 04 - Data Sheets.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.06 - UTILITY SYSTEMS

1.06.01 - Mains, Tank & Boosted Cold Water Systems

A 63mm MDPE branch pipework connection taken off the local supply authority's external underground main and meter, enters the building at ground floor level before converting to 42mm pipework and running to serve the domestic appliances of the building. The incoming pipework is furnished by way of an isolation valve, double control valve, stop cock valve, drain cock valve, solenoid valve, and a water meter.

Branch pipework connections have been taken at relevant locations throughout the building to serve the domestic appliances and electric hot water heaters located throughout the building.

The mains cold water is provided to the points of draw-off by way of a main distribution pipework system ranging from the plantroom and throughout the building, with branch pipework connections being taken off at relevant locations to supply appliances and electric hot water heaters by way of local isolation valves, wash hand basins also being furnished with thermostatic mixing valves.

For further details on the sanitaryware and electric hot water heaters, reference should be made to the manufacturer's literature within Section 04 - Data Sheets.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.06.02 - Domestic Hot Water Plant & Distribution

Local domestic hot water is generated by way of a series of electric hot water heaters, located throughout the building.

The electric hot water heaters re provided with a mains cold water connection, which is heated via the electric hot water heaters integral heating element, before being piped locally to serve the appliances.

For technical details on the electric hot water heaters, reference should be made to the manufacturer's literature within Section 04 - Data Sheets of the manual.

For further information on the location and configuration of the ductwork distribution systems, refer to the record drawings, scheduled and incorporated in Section 01 - Scope of Works.

1.07 - EMERGENCY

Introduction

The emergency procedures are intended as a guide only, for each emergency situation that arises has to be taken in the light of its degree of severity and the conditions prevailing at the time.

When an emergency situation is encountered it is imperative that calmness prevails. Measures and actions taken and made in haste or panic will not only, in all probability, be wrong but could spread panic in other people.

A few minutes spent in rationalising the situation and planning your campaign of actions, even in an emergency of the utmost gravity, will save time and possibly injury in the long run.

Never take risks in an emergency, for a risk can turn a minor emergency into a major one. The safety of personnel must always come first.

Any temporary repairs effected or arrangements made during or after an emergency must be corrected as soon as it is practically possible.

1.08 - EMERGENCY PROCEDURES

1.08.01 - Failure of Electrical Supply

This procedure describes the steps to take upon failure of the electrical supply.

NOTE:

Repairs to electrical switchgear and cables should only be undertaken by a fully qualified electrician.

1. Ascertain whether the failure is a general power failure or is restricted to a local circuit failure.

   Check whether general lighting and power is affected.

2. If failure is local, check whether fuses have blown or circuit breakers have tripped.

   Replace with correct size fuse or reset circuit breaker as required.

3. If the failure is general, isolate the supply to items of plant until the supply is restored.

1.08.02 - Failure of Water Supply

This procedure describes the actions to take in the event of a failure in the main water supply.

1. Inform local water authority of failure.

2. Try to conserve water by cutting down non-essential usage, e.g. hot water services, etc.

   Check that staff are informed about the failure and the necessity of limiting the usage of water.

3. Inform local Fire & Rescue Service of failure if it is expected to last for an extended period.

4. Keep a close watch on all storage and cold feed tank levels; should the level fall critically low, shut down systems.

1.08.03 - Failure of Gas Supply

This procedure describes the steps to take upon failure of the main gas supply.

NOTE:

If this procedure is not followed there is a chance of gas leak due to an appliance in operation at the time of failure not being switched off? This could have drastic and dangerous consequences. Therefore it is imperative this procedure, although short, is followed.

1. Turn off main gas cock at meter.

2. Inform local gas authority of failure.

3. Shut down all gas fired plant.

4. On resumption of gas supply check that all appliances served are switched off prior to opening main gas cock.

5. Re - energise items of mechanical plant shut down in Step 3.

1.08.04 - Water Leaks

This procedure describes the action to take in the event of a water leak.

Welding tube or replacing fittings, etc. should only be performed by a competent tradesman.

1. Ascertain where leak is coming from and place suitable receptacle under to prevent any further damage by water.

   Check the severity of the leak and damage done by water so far. If water has found its way into any electrical trunking, switchgear or apparatus, electrically isolate circuit and/or plant.

2. Try to stem leak with temporary seal.

3. Isolate the section of pipework or plant in which leak is occurring.
   Inform personnel affected by this action that service will be cut off.

4. Drain down isolated section or plant.

5. Ascertain type of leak, i.e. hole in pipework, split fitting, valve damaged, etc.

   Should replacement part be required, arrangements can be made to get part prior to commencing remedial work.

6. Repair leak and air pressure test.

7. On successful pressure test refill drained down section or plant.

8. Open valves used for isolating to their correct settings.
   Keep close check for further leaks until satisfied all is safe.

9. Energise isolated electrical circuit and/or plant when dried out.

1.08.05 - Gas Leaks

This procedure describes the action to take in the event of a gas leak.

1. Shut off all gas appliances and main gas supply.

2. Ventilate as much as possible the area affected by the leak.

3. Locate leak by pressurising gas main with nitrogen or similar inert gas and testing with a brush and soapy fittings, cock, etc.

   DO NOT pressurise with air as this will result in a highly explosive situation.

4. When located repair the leak.

5. When the repair is effected purge the mains with nitrogen.

   Check at all draw offs for satisfactory purging.

6. Turn on main gas supply.

7. Purge the nitrogen from mains.

   Check that gas is available at all draw offs.

1.08.06 - Refrigerant Leaks

This procedure describes the action to be taken in the event of a leak of refrigerant.

NOTE:

The refrigerant that leaks out will most probably be in vapour form and therefore the source of leak will be hard to find without proper leak detection equipment.

Refrigerants are virtually non - toxic even in concentrations of 0.1% by volume. It is non - combustible, although will break down under heat to form toxic gases.

1. Shut down and electrically isolate the affected refrigeration plant.

   Check that all doors of control panels are properly closed.

2. Evacuate all personnel from the vicinity and call in refrigeration engineers.

   NOTE: THERE MUST BE NO SMOKING OR FLAMES PRESENT AS THESE WILL CAUSE THE REFRIGERANT TO BREAK DOWN INTO HIGHLY TOXIC GASES.

3. Ensure that all doors to the room are securely shut.

1.08.07 - Steam Escape

This procedure describes the action to take in the event of an escape of steam from pipework.

WARNING :

Flash steam escape can be extremely dangerous and under no circumstances should any personnel attempt to provide manual intervention or temporary stemming of the source of the leak until the pipework has been safely isolated and allowed to cool.

NOTE:

Welding tube or replacing fittings, etc. should only be performed by a competent tradesman.

1. Ascertain where leak is coming from and exclude all personnel from the immediate vicinity of the leak.

   Check the severity of the leak and damage done by condensate so far. If condensate has found its way into any electrical trunking, switchgear or apparatus, electrically isolate circuit and/or plant.

2. Isolate the section of pipework or plant in which leak is occurring.

   Inform personnel affected by this action that service will be cut off.

3. Allow the isolated section to completely cool prior to any further intervention.

4. Drain down isolated section or plant.

5. Ascertain type of leak, i.e. hole in pipework, split fitting, valve damaged, etc.

   Should replacement part be required, arrangements can be made to get part prior to commencing remedial work.

6. Repair leak and air pressure test.

7. On successful pressure test refill drained down section or plant.

8. Open valves used for isolating to their correct settings.

   Keep close check for further leaks until satisfied all is safe.

9. Energise isolated electrical circuit and/or plant when dried out.

1.08.08 - Excessive Temperature Build - Up

This procedure describes the action to be taken in the event of excessive temperature build - up in a water heating system.

1. Take action to reduce input by shutting down boiler or calorifier. If necessary, run boiler or calorifier under manual control.

   Check constantly that the temperature and pressure are kept within the tolerable limits by manually cutting in and out of the burner.

   Check:-

   1) The heating pumps are running.

   2) Water is flowing through each operational boiler or calorifier.

   3) Operation of boiler or calorifier thermostats.

   4) Check that the expansion vessels are operating satisfactorily.

1.08.09 - Excessive Pressure Build - Up

This procedure describes the action to take in the event of excessive pressure build - up at boiler or hot water service calorifier.

1. On noticing a build-up of excessive pressure immediately shut down the plant's heat source, the burner in the case of a boiler or the primary heating in the case of a calorifier. This will immediately start to check the pressure rise.

   Check that the safety valve discharge is clear and that all personnel are well clear of the discharge.

2. Open valves covering plant to system.

   The pressure rise should be checked.

3. Ascertain reason for pressure rise.

   Check:-

   1) Open vent for blockage.

   2) Operation of thermostat.

   3) Operation of safety valve.

   4) Check pumps are running.

   5) Check expansion vessel is on - line and operating satisfactorily.

4. Do not bring plant into operation again until the cause of the pressure rise is found, understood and remedied.

1.08.10 - Excessive Temperature Build - Up (Steam / Calorifiers)

This procedure describes the action to be taken in the event of excessive temperature build - up in a water heating system.

1. Take action to reduce input by shutting down the steam supply to the primary side of the calorifier. If necessary, run calorifier under manual control.

   Check constantly that the temperature and pressure are kept within the tolerable limits by manually cutting in and out of the steam supply.

   Check:-

   1) The heating pumps are running.

   2) Water is flowing through each operational calorifier.

   3) Operation of high limit thermostats.

   4) Check that the expansion vessels are operating satisfactorily.

1.08.11 - Excessive Pressure Build - Up (Steam / Calorifiers)

This procedure describes the action to take in the event of excessive pressure build - up at the LPHW or HWS calorifiers.

1. On noticing a build-up of excessive pressure immediately shut down the plant's heat source, the primary steam supplies in the case of the calorifiers. This will immediately start to check the pressure rise.

   Check that the safety valve discharge is clear and that all personnel are well clear of the discharge.

2. Open valves covering plant to system.

   The pressure rise should be checked.

3. Ascertain reason for pressure rise.

   Check:-

   1) Open vent for blockage.

   2) Operation of thermostat.

   3) Operation of safety valve.

   4) Check pumps are running.

   5) Check expansion vessel is on - line and operating satisfactorily.

4. Do not bring plant into operation again until the cause of the pressure rise is found, understood and remedied.

1.08.12 - Fire

This procedure describes the action to take in the event of fire breaking out.

Always inform the FIRE & RESCUE SERVICE should fire break out and never attempt to fight it alone.

Beware of toxic fumes when in vicinity of fire. These are not necessarily visible. If in any doubt, abandon attempt to fight fire.
Remember, the gases are buoyant due to heat, therefore, the air is more breathable nearer floor level.

Never use a liquid type extinguisher to fight electrical fires.

1. Under most conditions occurrence of fire will be picked up by the automatic detection equipment. However, for certain locations, the manual 'break glass' fire alarm should be activated.
   Check that the fire alarm is a genuine 'break' (i.e. fire) condition and not a 'fault'.

2. Having ascertained the location of the fire, check out the severity and if it is local and contained, use fire fighting equipment provided - hand extinguishers, etc.

3. If the fire cannot be checked within a few minutes, the general alarm should be initiated and the FIRE & RESCUE SERVICE contacted. All plant should be shut down and isolated. The standard fire drill will be put into operation.

   Check that all personnel are evacuated from the immediate and surrounding areas first, then from the building completely.

4. The fire should be contained as far as possible, without personal risks taken, until the fire & rescue service has arrived.

   Check that all windows in the immediate and surrounding areas are closed, together with all fire doors.

1.09 - FIRST AID

1.09.01 - Principles and Practice

(a) Definition

First Aid is based on the principles of practical medicine and surgery; a knowledge of the subject in case of accident or sudden illness enables trained persons to give such skilled assistance as will preserve life, promote recovery and prevent the injury or illness becoming worse until medical aid has been obtained.

Medical Aid indicates treatment by a doctor.

First Aid consists of simple measures that anyone can learn but if carried out correctly, quickly, gently and as early as possible, they can be life-saving and may prevent the necessity for more complicated treatment later which may be too late to save life. It includes the necessity of giving the casualty confidence by talking to him and by reassuring him.

(b) First Aider's Responsibility

This ends when handed over to the care of a doctor, a nurse or other responsible person but not until they have taken over the whole responsibility for the case. The First Aider should not leave until he has made his report to the doctor or other responsible persons and has ascertained whether he could be of any further help.

First Aid, in general, is limited to the assistance rendered at the time of the emergency, with such material as is available and often extensive improvisation will be necessary.

Remember at all times the importance of COMMON SENSE in First Aid as an addition to the actual knowledge of the subject. This section (and other First Aid Manuals) usually considers for treatment only one condition at a time. However, in real life it will soon be found that serious accidents rarely produce only a single injury. Frequently, two injuries or more occur close together so that the correct treatment of one may interfere with the correct treatment of the other. One injury may require the casualty to be put on his back, another that he should be in the coma or recovery position. In such a circumstance, the First Aider must decide which injury is the most serious, or needs the most urgent treatment and treat that one in the correct way and then deal with the second injury as correctly as possible under the conflicting circumstances. Often a casualty suffers from more than two injuries at the same time which makes matters even more difficult.

(c) The Scope of First Aid

This consists of three parts:-

(i) Dealing with the situation, apart from the casualty.

(ii) Diagnosing what is the matter with the casualty and then giving the correct First Aid treatment.

(iii) Disposing of the casualty to Doctor, Hospital or Home and notifying those concerned about the accident.

In arriving at the diagnosis the First Aider is guided by:-

(a) The report furnished by persons present (which includes the conscious casualty) as to the cause of the injury or illness - HISTORY.

(b) The account given by the casualty of his own sensations and feelings- SYMPTOMS.

(c) His complete examination of the patient - - - - - - SIGNS.

(d) Priority in First Aid

Do first things first, quickly, quietly and methodically.

Reassure the casualty and those around to lessen anxiety, whilst taking in the situation.

If breathing has stopped, start resuscitation.

Control visible bleeding.

Give priority in the individual to the most important injuries.

Give priority where several are injured to those who will benefit most by prompt treatment.

Guard against shock - and look for concealed bleeding.

Immobilise fractures and larger wounds before moving the casualty - handle gently.

Do not remove clothes unnecessarily as this can be a painful or awkward procedure and the casualty may get cold.

Do not attempt too much - attend to the essential and prevent the condition from becoming worse.

Do not allow people to crowd around - they get in the way and fresh air is essential.

Arrange early for careful conveyance of the casualty to Hospital or to a Doctor.

1.09.02 - Life Saving Measures

(a) Electrical Injuries

Even with domestic voltages if an electric current passes through a person it may in some cases produce stoppage of breathing, burns and cardiac arrest.

(b) Breathing Stopped

If the victim stops breathing he will die, unless breathing is restored at once. First tilt his head back to open the air passage from mouth to lungs, squeeze the nostrils together then blow your own breath through his mouth into his lungs. If there is no improvement it is likely that the heart has stopped beating and must be restarted by compressing it by manual pressure on the chest wall.

(c) Bleeding

Bleeding from injuries must be controlled as severe loss of blood may lead to death. The best way to stop bleeding is to squeeze the injured part together BY DIRECT PRESSURE of the fingers on the wound or squeeze the edges of the wound together.

(d) Unconsciousness

The willing but untrained bystander is most helpless when confronted with the UNCONSCIOUS victim. The simplest act of turning such a victim on his side, in the COMA or RECOVERY position, so that he cannot drown in his own vomit, may save as many as 20% of such victims who would otherwise die.

(e) Shock

Shock is likely to be present in all cases of injury and many cases of sudden illness. Its effects which may be extremely serious may be mitigated by the comfort, confidence and reassurance supplied by the rescuer.

(f) Broken Bones

These are serious injuries - STOP ANY MOVEMENT OF BROKEN BONES which may make the injury more severe. Injured limbs may be secured to the body or the other uninjured limb.

(g) Burns and Scalds

These are common injuries and if a large part of the body is involved, death may result. Cool the affected area with cold water then cover with clean cloth or large dressing till seen by a Doctor.

1.09.03 - Emergency Situations

Be calm and take charge.

Ensure safety, i.e. from the possibility of falling masonry, etc.

Ask those present to remain if considered responsible as they may be able to help; otherwise they should be requested to stand clear.

Give each one a specific job e.g.

Ring up and notify the Police.

Ask for an Ambulance or send for a Doctor.

In each case, state the place of the accident and tell what has happened.

Ask if anyone has any First Aid knowledge.

Ask for help in turning the casualty or in steadying a limb.

In each case give exact instructions and if necessary show the bystander how your request should be carried out.

1.10 - HEALTH & SAFETY

1.10.01 - CoSHH

The following hazardous substances are contained within the installation. There is a possibility that the maintainer may come into contact with some or all of them.

Battery Electrolyte
Radioactive Isotopes (Contained in Smoke Detectors)
Fluorescent Lamp Coatings
Capacitor Electrolyte
Refrigerant Gas

None of the above are considered to be hazardous in use and are safe provided the equipment containing them is not broken up or disassembled. There are no special handling instructions, but specific disposal instructions i.e. they must be disposed of either by returning them to the original equipment manufacturer (by agreement), or by licensed waste disposal contractor.

The following hazardous substances are likely to be used to clean or maintain items within the installation. The cleaner/maintainer may come into contact with some or all of them.

General and Specialist Cleaning Fluids
De-greasing Agents
Greases and Oils
Solvents and Paints
Heating System Corrosion Inhibitor and System Cleaner

The cleaner/maintainer must take account of the requirements for maintenance, including only using substances that have been assessed and approved for use by them. The only substances that may be used are those assessed and approved, and all specified control measures must be in place.

If a substance is needed which is designated as hazardous but has not been assessed for use, then a proper detailed assessment must be carried out before it can be used. On no account may a substance that has not been so assessed be used in the premises for any purpose whatsoever.

1.10.02 - Danger from Electrical Energy

Only persons trained and competent in the safe use and operation of the electrical equipment concerned may be permitted to carry out any work on it, including making safe prior to destruction or disposal. It is an absolute requirement that the electricity supply to the equipment and/or area concerned has been disconnected and made safe before any other work is allowed to commence. If in any doubt at all, engage an Electrical Contractor to make the work area safe from the hazard of electrical energy.

1.10.03 - Danger from Rotating or Moving Parts

All machines, after de-energisation, have the potential for movement even after the power source has been removed. Such machines must be brought to rest and all potential for re-starting effectively removed before any handling for demolition or disposal is permitted. Where ongoing danger exists from any subsequent free rotation or other non-powered movement, the machine must be secured from such further movement before handling.

1.10.04 - Danger from Physical Handling

In order to protect the individual from injury caused through physical handling of hazardous or cumbersome equipment, the appropriate protective measures must be taken. These include equipping the individual with appropriate training, personal protective equipment and mechanical plant necessary to enable them to do the job safely.

On no account should any risks be taken in the demolition and disposal of electrical or mechanical equipment. If in doubt, consult a qualified Engineer or M&E Contractor.

1.10.05 - Danger from Hazardous Substances

Any known hazardous materials that comprise the equipment to be demolished and destroyed must be handled and disposed of safely. It is not sufficient or particularly appropriate to write up procedures for safe handling and disposal, since the element of risk and the appropriate control measures can change. Therefore, at the time the work is required, the appropriate hazards must be assessed for risk and appropriate control measures developed in the form of method statements in order to create a safe system of work for demolition and disposal.

There can be no excuse for anyone to take risks in handling equipment for disposal. Check on the procedures deemed to be appropriate AT THAT TIME.

1.10.06 - Legionnaire's Disease

The bacterium Legionella pneumophila, which causes Legionnaire's Disease, is widely distributed in nature and commonly found in surface water and soil. It is not normally found in mains water but given the right conditions, can establish itself in water systems in buildings.

Conditions that favour the colonisation of water systems include stagnation and temperatures between 20^{o}C and 45^{o}C.

Below 10^{o}C to 15^{o}C, pneumophila survives but seems not to flourish. Between perhaps 20^{o}C to 45^{o}C it can multiply and above 55^{o}C it is killed, albeit only in proportion to temperature and time exposed.

Causes of Legionella

Although not yet proven conclusively there is strong evidence to suggest that the principal route for infection in humans is by inhalation deep into the lungs of small (i.e. <5microns diameter) water droplets containing Legionella pneumophila.

Attention therefore focuses not only on the aerosol mist from air conditioning system cooling towers but also on showers, spray taps and WCs. However, the visible 'mists' that can be produced by all these appliances are composed largely of particles > 5 microns diameter and with the exception of showers there is, at the present time, little reason to suppose that spray taps are any less safe that other taps.

The reason is simply that all can produce the invisible aerosols that may be potentially dangerous. Such aerosols can, in certain circumstances, travel several kilometres before evaporation.

Cold Water Storage and Distribution Systems

Ideally, cold water must be kept and distributed at a temperature below 20^{o}C, which is the temperature below which bacterial growth is restricted. Since this is not generally practicable it is recommended that all reasonable means should be used to keep the temperature down as near to 20^{o}C as possible and to eliminate any local abnormal temperature rises in the cold water system. This will not be relevant to separate drinking water systems where these are supplied directly from the Water Company's mains.

Hot Water Systems

The temperature controllers serving the hot water system must be set such that the hot water is stored at a temperature of 60^{o}C and distributed at a temperature not less than 50^{o}C in order to avoid infection through bacterial growth.

Where a tap, shower head or similar fitting is not used for over a week it is recommended that the hot water valve be fully opened for a few minutes daily in order to reduce the risk of bacterial growth.

It is therefore imperative that a Water Treatment Programme be drawn up and implemented as outlined in Section 6.13.

1.10.07 - Design Capabilities and Limitations

Carter Electrical Services carried out all mechanical services design work in their capacity as Consulting Engineers for the project. Details of their design philosophy and calculations are available direct from them and under cover of documentation separate from this O&M manual.

The design of the building services has taken into account the nature of occupancy and use of the building, and all identifiable risk has been minimised. The design work was carried out in co-operation with the Local Authority Engineers, in order to ensure that all specific risks were identified, assessed and taken into account. These risk assessments relate to the particular needs of the occupants of the building.

All identified risks were designed out of the installation. There are no known residual risks associated with this building services installation.

1.10.08 - QA Standards

Quality has been assured at every stage of the project. The fundamental international standard BS EN ISO 9001:2000 has been complied with throughout the design, construction and setting to work processes. This covered the design of systems, selection and procurement of materials, installation, testing and commissioning.

1.10.09 - Safe Access Detail

One of the most important considerations for any building services installation designer is to ensure that sufficient space is allowed within the design for personnel to access, operate and maintain the installation safely.

Further, in the event of an emergency, the space allowance must be sufficient to enable personnel to take evasive action and/or escape to safety.

These considerations have been taken into account in designing this installation. There is adequate safe working space in all areas.

All areas where mechanical plant and equipment is housed or controlled are inaccessible to general occupants. A simple lock and key arrangement controls access by the maintenance staff.

1.10.10 - Fire Prevention Standards

Fire prevention in buildings generally comprises the selection of construction materials that are either non-combustible or have low smoke/fume properties, together with the provision of automatic systems that act to warn of fire.

In the event that a fire occurs, there is an automatic fire detection and alarm system in place that has been designed, installed, tested and commissioned in accordance with British Standard BS5839-1:2002.

Additional measures have been incorporated into the building services installation to prevent the spread of fire and smoke (fire damping, fire compartmentation), also systems to aid evacuation of the building (e.g. emergency lighting, disabled refuge alarms). However, these do not in themselves constitute fire prevention measures.

1.11 - RECORD DRAWINGS

Drawing Number	Title
P21024-CES-XX-XX-DR-M-1001	Above Ground Drainage Layout
P21024-CES-XX-XX-DR-M-1002	Above Ground Drainage Schematic
P21024-CES-XX-XX-DR-M-2001	Domestic Hot & Cold Water Layout
P21024-CES-XX-XX-DR-M-2002	Domestic Hot & Cold Water Schematic
P21024-CES-XX-XX-DR-M-4001	Ventilation, AC & Heating Layout
P21024-CES-XX-XX-DR-M-4002	Ventilation Schematic

Certificates/Warranties/Guarantees

winvic.co.uk

Commissioning Report

DATE	Jul-22
CLIENT	Winvic
ADDRESS	Peel Avenue
	Calder Park
	Wakefield
	WF2 7UA
CONTACT	A.Soane
TELEPHONE	7808794305

Climate Installations UK Ltd
75 Ashover Road
Old Tupton
Chesterfield
S42 6HQ
Mobile: 07975621747 / 07812521216
E-mail: climateinstallations@gmail.com

Carters Drawing Ident	FCU 20	FCU 21								
Daikin Address	NA	NA								
Manufacturer	DAIKIN	DAIKIN								
FCU Model Number	FCAG125BVEB	FCAG140BVEB								
FCU Serial Number	J019667	J011569								
CU Model Number	RZASG125M7V1B	RZASG140M7V1B								
CU Serial Number	3211226	3209615								
Voltage	235V	235V								
Strengh/Leak Test Level	35 Bar/42 Bar	35 Bar/42 Bar								
Evacuation Level	0.71 Torr	0.52 Torr								
Low Pressure	7 Bar	7 Bar								
High Pressure	20 Bar	20 Bar								
Compressor Amps	9A	9A								
Cooling Air On	18K	17K								
Cooling Air Off	3K	3K								
Heating Air On	21K	23K								
Heating Air Off	40K	40K								
Pump/Drain Check	☑	☑								
Pump/Drain Type	Gravity	Gravity								
Total Charge	3.1KG R32	3.6KG R32								
Base Refrigerant Charge	2.6KG R32	2.9KG R32								
Additional Refrigerant Cha	0.5KG R32	0.7KG R32								
CO2 Equivalent Tonnes	2.09	2.43								
Engineers Name	Ashley Warren									
Client Name	Winvic									

Commissioning Report

DATE	**Jul-22**
CLIENT	**Winvic**
ADDRESS	**Peel Avenue**
	Calder Park
	Wakefield
	WF2 7UA
CONTACT	**A.Soane**
TELEPHONE	**7808794305**

Climate Installations UK Ltd
75 Ashover Road
Old Tupton
Chesterfield
S42 6HQ
Mobile: 07975621747 / 07812521216
E-mail: climateinstallations@gmail.com

Carters Drawing Ident	**FCU 01**	**FCU 02**	**FCU 03**	**FCU 04**	**FCU 05**	**FCU 06**	**FCU 07**	**FCU 08**	**FCU 09**	**FCU 10**
Daikin Address	**1.01**	**1.02**	**1.03**	**1.04**	**1.05**	**1.06**	**1.07**	**1.08**	**1.09**	**1.10**
Manufacturer	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**
FCU Model Number	**FXSQ125A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**
FCU Serial Number	**J048665**	**J069646**	**J069648**	**J069651**	**J069650**	**J069647**	**J069973**	**J069955**	**J069963**	**J069974**
CU Model Number	**Master: REYQ18U7Y1B Slave: REYQ10U7Y1B**									
CU Serial Number	**5203259/4204790**									
Voltage	**415V**									
Strengh/Leak Test Level	**35 Bar/42 Bar**									
Evacuation Level	**0.68 Torr**									
Low Pressure	**7 Bar**									
High Pressure	**25 Bar**									
Compressor Amps	**16A/10A**									
Cooling Air On	**21K**	**21K**	**21K**	**21K**	**21K**	**21K**	**21K**	**21K**	**21K**	**21K**
Cooling Air Off	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**
Heating Air On	**23K**	**23K**	**23K**	**23K**	**23K**	**23K**	**23K**	**23K**	**23K**	**23K**
Heating Air Off	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**
Pump/Drain Check	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Pump/Drain Type	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**
Total Charge	**43.6kg R410a**									
Base Refrigerant Charge	**21.6kg R410a**									
Additional Refrigerant Cha	**22kg R410a**									
CO2 Equivalent Tonnes	**91.03**									

Engineers Name	**Ashley Warren**
Client Name	**Winvic**

Commissioning Report

DATE	**Jul-22**
CLIENT	**Winvic**
ADDRESS	**Peel Avenue**
	Calder Park
	Wakefield
	WF2 7UA
CONTACT	**A.Soane**
TELEPHONE	**7808794305**

Climate Installations UK Ltd

75 Ashover Road
Old Tupton
Chesterfield
S42 6HQ

Mobile: 07975621747 / 07812521216
E-mail: climateinstallations@gmail.com

Carters Drawing Ident	**FCU 11**	**FCU 12**	**FCU 13**	**FCU 14**	**FCU 15**	**FCU 16**	**FCU 17**	**FCU 18**	**FCU 19**	
Daikin Address	**2.01**	**2.02**	**2.03**	**2.04**	**2.05**	**2.06**	**2.07**	**2.08**	**2.09**	
Manufacturer	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	**DAIKIN**	
FCU Model Number	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	**FXSQ80A2VEB**	
FCU Serial Number	**J069840**	**J069733**	**J069331**	**J069719**	**J069542**	**J069842**	**J069843**	**J069838**	**J069841**	
CU Model Number	**Master: REYQ12U7Y1B Slave: REYQ12U7Y1B**									
CU Serial Number	**4206364/4206295**									
Voltage	**415V**									
Strengh/Leak Test Level	**35 Bar/42 Bar**									
Evacuation Level	**0.64 Torr**									
Low Pressure	**7 Bar**									
High Pressure	**26 Bar**									
Compressor Amps	**12A/12A**									
Cooling Air On	**20K**	**20K**	**20K**	**20K**	**20K**	**20K**	**20K**	**20K**	**20K**	**20K**
Cooling Air Off	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**	**6K**
Heating Air On	**25K**	**25K**	**25K**	**25K**	**25K**	**25K**	**25K**	**25K**	**25K**	**25K**
Heating Air Off	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**	**40K**
Pump/Drain Check	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Pump/Drain Type	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**	**Gravity**
Total Charge	**40.8kg R410a**									
Base Refrigerant Charge	**19.8kg R410a**									
Additional Refrigerant Cha	**21kg R410a**									
CO2 Equivalent Tonnes	**85.19**									

Engineers Name	**Ashley Warren**
Client Name	**Winvic**

P & A Environmental Ltd

Specialist in Water Treatment and Building Services Hygiene

Disinfection Certificate
(In accordance with BS 8558:2015)

Address of Project:	**Gatehouse Calder Park Wakefield**
Date of Completion of Works:	22/09/2022
Works carried out on behalf of:	JWN Commissioning Services Ltd
P & A Env Ltd Ref Number:	N/A
Name of Engineer(s):	Paul Fernley
Chemical Used:	Sodium Hypochlorite
Chlorine Level after Dosing:	> 50 mg / l
Contact Time:	1 Hour
Chlorine Level after Contact:	> 50 mg / l
Chlorine Level after Flushing:	< 0.2 mg / l
Samples taken from:	Sink MCWS
Sample Results:	Awaiting analysis results.
Services Sterilised/Cleaned:	Mains CWS
Method of neutralisation:	Flush to Waste

Recommended date of next cleaning/disinfection: N/A

Comments: N/A

Signed:  **Position:** Director

THIS IS AN IMPORTANT ANNUAL OPERATION REQUIRED BY THE HEALTH & SAFETY EXECUTIVE. TO ARRANGE THE NEXT ANNUAL VISIT AND OR YOUR ANNUAL / MONTHLY / QUARTERLEY MAINTENANCE REQUIREMENTS PLEASE CONTACT

E Mail: paul@paenvironmental.org.uk Telephone: 01942-393126

This is to certify that the above system has been cleaned/disinfected in accordance with British Standard 8558 Specification for: Design installation, testing and maintenance services supplying water for domestic use within buildings and their curtilages.

BSRIA Member

P&A Env Ltd 43 Lodge Road Atherton Manchester M46 9BL
E-mail: paul@paenvironmental.org.uk
Company Reg. No. 11655688

P & A Environmental Ltd

Specialist in Water Treatment and Building Services Hygiene

Disinfection Certificate
(In accordance with BS 8558:2015)

Address of Project:	**Hub Building Calder Park Wakefield**
Date of Completion of Works:	22/09/2022
Works carried out on behalf of:	JWN Commissioning Services Ltd
P & A Env Ltd Ref Number:	N/A
Name of Engineer(s):	Paul Fernley
Chemical Used:	Sodium Hypochlorite
Chlorine Level after Dosing:	> 50 mg / l
Contact Time:	1 Hour
Chlorine Level after Contact:	> 50 mg / l
Chlorine Level after Flushing:	< 0.2 mg / l
Samples taken from:	Kitchen Area Sink MCWS
Sample Results:	Awaiting analysis results.
Services Sterilised/Cleaned:	Mains CWS
Method of neutralisation:	Flush to Waste

Recommended date of next cleaning/disinfection: N/A

Comments: N/A

Signed:  **Position:** Director

THIS IS AN IMPORTANT ANNUAL OPERATION REQUIRED BY THE HEALTH & SAFETY EXECUTIVE. TO ARRANGE THE NEXT ANNUAL VISIT AND OR YOUR ANNUAL / MONTHLY / QUARTERLEY MAINTENANCE REQUIREMENTS PLEASE CONTACT

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BSRIA Member

P&A Env Ltd 43 Lodge Road Atherton Manchester M46 9BL
E-mail: paul@paenvironmental.org.uk
Company Reg. No. 11655688

P & A Environmental Ltd

Specialist in Water Treatment and Building Services Hygiene

Disinfection Certificate
(In accordance with BS 8558:2015)

Address of Project:	**Office Building Calder Park Wakefield**
Date of Completion of Works:	22/09/2022
Works carried out on behalf of:	JWN Commissioning Services Ltd
P & A Env Ltd Ref Number:	N/A
Name of Engineer(s):	Paul Fernley
Chemical Used:	Sodium Hypochlorite
Chlorine Level after Dosing:	> 50 mg / l
Contact Time:	1 Hour
Chlorine Level after Contact:	> 50 mg / l
Chlorine Level after Flushing:	< 0.2 mg / l
Samples taken from:	Kitchen MCWS
Sample Results:	Awaiting analysis results.
Services Sterilised/Cleaned:	Mains CWS
Method of neutralisation:	Flush to Waste

Recommended date of next cleaning/disinfection: N/A

Comments: N/A

Signed:  **Position:** Director

THIS IS AN IMPORTANT ANNUAL OPERATION REQUIRED BY THE HEALTH & SAFETY EXECUTIVE. TO ARRANGE THE NEXT ANNUAL VISIT AND OR YOUR ANNUAL / MONTHLY / QUARTERLEY MAINTENANCE REQUIREMENTS PLEASE CONTACT

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BSRIA Member

P&A Env Ltd 43 Lodge Road Atherton Manchester M46 9BL
E-mail: paul@paenvironmental.org.uk
Company Reg. No. 11655688

Fire Damper Drop Test Log

CLIENT NAME:	Carter Electrical
PROJECT NAME:	Calder Park
SITE ADDRESS:	Calder Park, Wakefield, WF2 7UA
FLOOR:	First Floor
ENGINEER:	Thomas Warner
DRAWING REF:	P21024-CES-XX-XX-DR-M-4001 Rev C03
INSPECTION DATE:	20th July 2022

Damper Ref No	Location	Size	Access Door Location	Fire Stopping	Blade Operation	FD Link accessibility	Correct Installation	Notes
FF/FD - 01	Corridor	200mm dia	Corridor	By Others	Y	Y	Y	
FF/FD - 02	Male Lobby	200mm dia	Male Lobby	By Others	Y	Y	Y	
FF/FD - 03	Male Toilet	200mm dia	Male toilet	By Others	Y	Y	Y	
FF/FD - 04	Female Toilet	200mm dia	Female Toilet	By Others	Y	Y	Y	
FF/FD - 05	Meeting	200mm dia	Meeting	By Others	Y	Y	Y	

NOTES/DELAYS/ISSUES/CHANGES

THIS SECTION MUST BE COMPLETED BY THE LEAD ENGINEER ON SITE.

SIGNED..... *T Warner*

IF CUSTOMER SATISFACTION SIGNITURE IS REQUIRED:

SIGNED.....

GPL SPECIALIST VENTILATION SERVICES LTD, Suites 104 105 Imperial House, 79 - 81 Hornby Street, Bury BL9 5BN
TEL: 0161 705 4391
E: info@gplventilation.com

Fire Damper Drop Test Log

CLIENT NAME:	Carter Electrical
PROJECT NAME:	Calder Park
SITE ADDRESS:	Calder Park, Wakefield, WF2 7UA
FLOOR:	Ground Floor
ENGINEER:	Thomas Warner
DRAWING REF:	P21024-CES-XX-XX-DR-M-4001 Rev C03
INSPECTION DATE:	20th July 2022

Damper Ref No	Location	Size	Access Door Location	Fire Stopping	Blade Operation	FD Link accessibility	Correct Installation	Notes
GF/FD - 01	Corridor	200mm dia	Corridor	By Others	Y	Y	Y	
GF/FD - 02	Male Lobby	200mm dia	Male Lobby	By Others	Y	Y	Y	
GF/FD - 03	Male Toilet	200mm dia	Male toilet	By Others	Y	Y	Y	
GF/FD - 04	Female Toilet	200mm dia	Female Toilet	By Others	Y	Y	Y	

NOTES/DELAYS/ISSUES/CHANGES

THIS SECTION MUST BE COMPLETED BY THE LEAD ENGINEER ON SITE.

SIGNED..... TWarner

IF CUSTOMER SATISFACTION SIGNITURE IS REQUIRED:

SIGNED.....

GPL SPECIALIST VENTILATION SERVICES LTD, Suites 104 105 Imperial House, 79 - 81 Hornby Street, Bury BL9 5BN
TEL: 0161 705 4391
E: info@gplventilation.com

Fire Damper Drop Test Log

CLIENT NAME:	Carter Electrical
PROJECT NAME:	Calder Park
SITE ADDRESS:	Calder Park, Wakefield, WF2 7UA
FLOOR:	Second Floor
ENGINEER:	Thomas Warner
DRAWING REF:	P21024-CES-XX-XX-DR-M-4001 Rev C03
INSPECTION DATE:	20th July 2022

Damper Ref No	Location	Size	Access Door Location	Fire Stopping	Blade Operation	FD Link accessibility	Correct Installation	Notes
SF/FD - 01	Corridor	200mm dia	Corridor	By Others	Y	Y	Y	
SF/FD - 02	Male Lobby	200mm dia	Male Lobby	By Others	Y	Y	Y	
SF/FD - 03	Male Toilet	200mm dia	Male toilet	By Others	Y	Y	Y	
SF/FD - 04	Female Toilet	200mm dia	Female Toilet	By Others	Y	Y	Y	
SF/FD - 05	Meeting	200mm dia	Meeting	By Others	Y	Y	Y	

NOTES/DELAYS/ISSUES/CHANGES

THIS SECTION MUST BE COMPLETED BY THE LEAD ENGINEER ON SITE.

SIGNED..... *T Warner*

IF CUSTOMER SATISFACTION SIGNITURE IS REQUIRED:

SIGNED.....

GPL SPECIALIST VENTILATION SERVICES LTD, Suites 104 105 Imperial House, 79 - 81 Hornby Street, Bury BL9 5BN
TEL: 0161 705 4391
E: info@gplventilation.com

Fire Damper Drop Test Log

CLIENT NAME:	Carter Electrical
PROJECT NAME:	Calder Park
SITE ADDRESS:	Calder Park, Wakefield, WF2 7UA
FLOOR:	Third Floor
DRAWING REF:	P21024-CES-XX-XX-DR-M-4001 Rev C03
ENGINEER:	Thomas Warner
INSPECTION DATE:	20th July 2022

Damper Ref No	Location	Size	Access Door Location	Fire Stopping	Blade Operation	FD Link accessibility	Correct Installation	Notes
TF/FD - 01	Riser Slab	400mm dia	Riser Slab	By Others	**Y**	**Y**	**N**	Tech Screws used on one side
								These will be Changed 29.09.22

NOTES/DELAYS/ISSUES/CHANGES

THIS SECTION MUST BE COMPLETED BY THE LEAD ENGINEER ON SITE.

SIGNED..... T Warner

IF CUSTOMER SATISFACTION SIGNITURE IS REQUIRED:

SIGNED.....

GPL SPECIALIST VENTILATION SERVICES LTD, Suites 104 105 Imperial House, 79 - 81 Hornby Street, Bury BL9 5BN
TEL: 0161 705 4391
E: info@gplventilation.com

DUCTWORK GENERAL INSTALLATION NOTES:

1. ALL DUCTWORK SYSTEMS INSTALLED IN ACCORDANCE WITH DW/144 SPECIFICATION FOR SHEET METAL DUCTWORK FOR LOW PRESSURE "CLASS A" SYSTEMS.
2. ALL DUCTWORK MANUFACTURED FROM HOT DIP GALVANISED STEEL TO BS.EN101:1991, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
3. RECTANGULAR DUCTWORK CROSS JOINTS SHOULD BE SEALED IN ACCORDANCE WITH DW/144 FIGS 10, 13&14, FASTENINGS AND MAXIMUM SPACINGS IN ACCORDANCE WITH SECTION 10.7
4. CIRCULAR DUCTWORK SPIRAL WOUND AND STRAIGHT SEAMED JOINTS SEALED IN ACCORDANCE WITH DW144 FIGS 32~45, FASTENINGS AND MAXIMUM SPACINGS IN ACCORDANCE WITH SECTION 13.3
5. ALL DUCTWORK TO BE SUPPORTED IN ACCORDANCE WITH DW/144 ARRANGEMENT OF BEARERS AND HANGERS FIG. 64~67 INCLUSIVE.
6. ACCESS PANELS PROVIDED ADJACENT TO ALL FIRE DAMPERS.
7. INSPECTION PANELS PROVIDED ADJACENT TO ALL VOLUME CONTROL DAMPERS.
8. PERIODIC CLEANING ACCESS HATCHES PROVIDED AT 4 METRE CENTRES AND AT CHANGES IN DIRECTION.
9. ALL ACCESS/INSPECTION HATCHES ARE PROPRIETARY MANUFACTURED WITH QUICK RELEASE CATCHES AND SELF SEALING GASKETS.
10. ALL ACCESS/INSPECTION PANELS REMAIN ACCESSIBLE, THE INSULATION CONTRACTOR HAS SUITABLY DRESSED THE EDGES OF THE INSULATION TO THE EDGE OF THE ACCESS OPENING.
11. THE USE OF FLEXIBLE DUCTWORK IS LIMITED TO 500mm IN LENGTH TO MAKE FINAL CONNECTIONS ONLY.
12. DUCTWORK MANUFACTURED WITH GRADUAL TRANSFORMATIONS AND CHANGES OF SHAPE/DIRECTION.
13. TURNING VANES INSTALLED IN ALL RECTANGULAR SECTION DUCTWORK AT ALL CHANGES IN DIRECTION WHETHER INDICATED ON THE DRAWINGS OR NOT.
14. SPLITTERS INCORPORATED WITHIN RECTANGULAR DUCTWORK WITH AN ASPECT RATIO OF GREATER THAN 4:1 AS DW/144 WHETHER INDICATED ON THE DRAWINGS OR NOT.
15. FLEXIBLE CONNECTIONS INCORPORATED WITHIN THE DUCTWORK SYSTEM TO ISOLATE THE DUCTWORK DISTRIBUTION SYSTEM FROM VIBRATION PRODUCING EQUIPMENT.
16. GRILLES AND DIFFUSERS PROVIDED WITH THE MANUFACTURERS PURPOSE MADE PLENUM BOX (SIDE OR TOP ENTRY SPIGOT AS NECESSARY) WHERE INDICATED.
17. ALL GRILLES AND DIFFUSERS PROVIDED WITH OPPOSED BLADE DAMPERS WITHIN THE DUCTWORK SERVING THE GRILLE OR DIFFUSER.
18. ALL GRILLES AND DIFFUSERS HAVE A FINISH/COLOUR TO SUIT THE ARCHITECTS REQUIREMENTS.
19. ALL CONTROL DAMPERS ARE HAND ADJUSTABLE WITH A LOCKING DEVICE AND ARE MULTI~BLADE, DOUBLE SKINNED TYPE WITH OPPOSED BLADE ACTION.
20. ALL AIR DISTRIBUTION DUCTS PASSING THROUGH ELEMENTS OF STRUCTURE FORMING FIRE COMPARTMENTS SHALL INCORPORATE A FIRE DAMPER. THE FIRE DAMPER ARRANGEMENT INCLUDING SUITABLE HVCA INSTALLATION FRAME, HAVE A FIRE RESISTANCE RATING EQUAL TO THE ELEMENT WHICH IT PENETRATES WITH A MINIMUM RATING OF 1 HOUR.
21. ALL FIRE DAMPERS ARE OF THE FOLDING CURTAIN TYPE, OUT OF THE AIRSTREAM, PERMITTING THE MAXIMUM FREE AREA IN THE AIRWAY.
22. THE FIRE DAMPER BLADE IS OF STAINLESS STEEL CONSTRUCTION AND SHALL BE HELD IN THE OPEN POSITION BY MEANS OF A THERMAL RELEASE MECHANISM RATED AT 72°C +/~ 2°C.
23. ALL FIRE DAMPERS ARE PROVIDED WITH AN INDICATING DEVICE ON THE OUTSIDE OF THE DAMPER PROVIDING VISUAL INDICATION OF THE DAMPER POSITION.
24. ALL FRESH AIR INTAKE & EXHAUST AIR DUCTWORK IS INSULATED, VAPOUR SEALED AND WEATHERPROOFED WHERE NECESSARY (ATMOSPHERE SIDE ONLY AND/OR WHERE AIR SUPPLIED IS USED TO PROVIDE SPACE HEATING/COOLING). THE INSULATION HAS AN ENVIRONMENTAL THICKNESS BETWEEN 20MM AND 50MM (TO SUIT THE IN DUCT AND AMBIENT AIR TEMPERATURES) WITH A MAXIMUM THERMAL CONDUCTIVITY OF 0.035 W/mK
25. UPON COMPLETION OF THE WHOLE VENTILATION INSTALLATION THE SYSTEM IS BALANCED AND COMMISSIONED IN ACCORDANCE WITH CIBSE COMMISSIONING CODE A.

LEGEND

- SUPPLY GRILLE ~ RECTANGULAR
- EXTRACT GRILLE ~ RECTANGULAR
- VOLUME CONTROL DAMPER ~ MANUAL
- RISING / DROPPING DUCTWORK
- FLEXIBLE CONNECTION
- EQUIPMENT CONTROLLER ~ LOCAL
- ATTENUATOR
- FIRE DAMPER ~ GRAVITY / CURTAIN BLADED
- FIRE DAMPER ~ CIRCULAR / EXTERNAL RESET TYPE
- ACCESS HATCH ~ CEILING
- ACCESS DOOR ~ DUCTWORK
- U/S OF DUCT ELEVATION FROM FFL
- LEV CONNECTION POSITION

NOTES

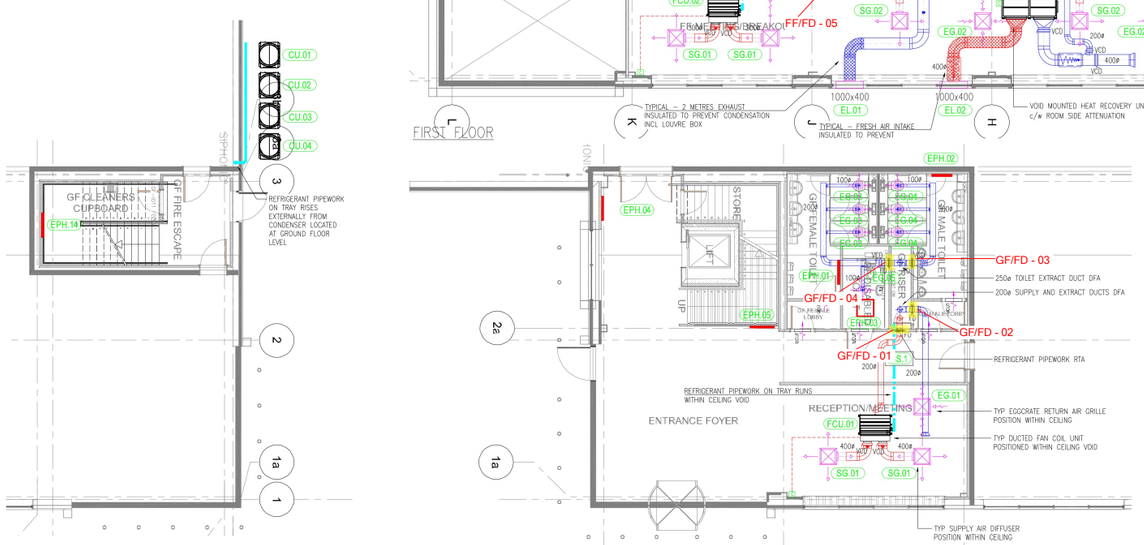
1. ALL PIPEWORK TO BE SLEEVED & FIRE STOPPED TO BS:476 (1HR MINIMUM) WHERE PASSING THROUGH FIRE WALLS/CAVITY BARRIERS/FLOOR. SLEEVES TO BE FLUSH WITH SERVICES WHERE PIPEWORK EXPOSED.
2. CONDENSATE DRAINS TO BE RUN TO NEAREST SUITABLE DRAIN AND INCORPORATE SELF SEALING TAPS.
3. CONDENSATE PUMPS TO BE USED WHERE CONDENSATE CAN NOT FALL TO DRAIN.
4. ALL AIR CONDITIONING UNITS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
5. CONDENSATE PIPE WORK SHALL BE INDEPENDENTLY SUPPORTED AND NOT TO BE LAID ON OR IMPOSE WEIGHT ON THE CEILINGS.
6. ALL REFRIGERANT PIPE WORK SHALL BE PROVIDED WITH THERMAL INSULATION.
7. THE INSTALLER SHALL ENSURE THAT BEST PRACTICE INSTALLATIONS ARE PROVIDED THROUGHOUT THE INSTALLATION OF THE SYSTEMS AND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
8. ALL PIPEWORK IN THE CEILING VOIDS AND CONCEALED SPACES SHALL BE INSULATED WITH ARMAFLEX INSULATION WITH TAPE JOINTS TO PROVIDE A VAPOUR SEAL.

LEGEND

- EQUIPMENT CONTROLLER ~ LOCAL
- INDICATES CONTROLS CONNECTION
- REFRIGERANT PIPEWORK ROUTE
- ELECTRIC PANEL HEATER

PANEL HEATER SCHEDULE

ROOM	REF	MANUFACTURER	MODEL	TYPE	ROOM (W)	OUTPUT (W)	DIMENSIONS (WxHxDmm)	FINISH / COLOUR
GF~FEMALE TOILET	EPH.01	HYCO ACCONA	AC 1000 T	ELEC	804	1000	460x400x90	WHITE / STANDARD
GF~MALE TOILET	EPH.02	HYCO ACCONA	AC 1000 T	ELEC	913	1000	460x400x90	WHITE / STANDARD
GF~DISABLED TOILET	EPH.03	ENERGO CASSETTE	ENC~300	RADIANT PANEL	333	300	593x593x45	WHITE / STANDARD
GF~ENTRANCE FOYER/STAIRWELL	EPH.04&05	HYCO ACCONA	AC 2400 T	ELEC	4787	2400	950x400x90	WHITE / STANDARD
FF ~ FEMALE TOILET	EPH.06	HYCO ACCONA	AC 1000 T	ELEC	837	1000	460x400x90	WHITE / STANDARD
FF~MALE TOILET	EPH.07	HYCO ACCONA	AC 1000 T	ELEC	851	1000	460x400x90	WHITE / STANDARD
FF~DISABLED TOILET	EPH.08	ENERGO CASSETTE	ENC~300	RADIANT PANEL	355	300	593x593x45	WHITE / STANDARD
SF ~ FEMALE TOILET	EPH.09	HYCO ACCONA	AC 1000 T	ELEC	816	1000	460x400x90	WHITE / STANDARD
SF~MALE TOILET	EPH.10	HYCO ACCONA	AC 1000 T	ELEC	851	1000	460x400x90	WHITE / STANDARD
SF~DISABLED TOILET	EPH.11	ENERGO CASSETTE	ENC~300	RADIANT PANEL	347	300	593x593x45	WHITE / STANDARD
DOCK TOWER ~ WC1	EPH.12	HYCO ACCONA	AC 500 T	ELEC	149	500	460x400x90	WHITE / STANDARD
DOCK TOWER ~ WC2	EPH.13	HYCO ACCONA	AC 500 T	ELEC	173	500	460x400x90	WHITE / STANDARD
GF ~ CLEANERS CUPBOARD	EPH.14	HYCO ACCONA	AC 500 T	ELEC	425	500	460x400x90	WHITE / STANDARD



Rev.	Description	Drn	Chk	Date
C03	DOCK TOWER VENTILATION SCHEME REVISED.	MDS	SDR	
C02	CONDENSER UNITS RELOCATED TO EXTERNAL COMPOUND.	MDS	SDR	
C01	ISSUED FOR CONSTRUCTION.	MDS	SDR	23.03.22
P01	FIRST ISSUE	MDS	SDR	21.04.22

BASED ON: ARCHITECTS

Drawing Status: CONSTRUCTION

CARTER
ELECTRICAL SERVICES LIMITED
Unit 6, North Staffs Business Park, Innovation Way, Stoke, ST4 6RF
Email : info@carterelectrical.co.uk
Telephone: 01782 822250
www.carterelectrical.co.uk

Project: CALDER PARK

Title: VENTILATION, AC & HEATING LAYOUT

Architect:

Consultant:

Designer: MDS	Project Manager:	CAD: MDS	Checked: SDR
Date: JAN '22	Cost File:		Scale: 1:75 A0

Drawing No.: P21024~CES~XX~XX~DR~M~4001 Rev.: C03

Copyright: Carter Electrical Services LTD
Contractors are to check all dimensions on site and refer any discrepancies to Carter Electrical immediately

Pressure Test Record Sheet

Climate Installations UK Ltd
75 Ashover Road
Old Tupton
Chesterfield
S42 6HQ
Mobile: 07975621747 / 07812521216
E-mail: climateinstallations@gmail.com

Client	Address
Winvic	
Contact:- Adam Soane	Winvic, Calder Park, Peel Avenue, Wakefield, WF2 7UA

System		Type Of Test	
Air-Conditioning	√	OFN Pressure Test	√
Ventilation		OFN Strength Test	√
Plumbing		Air Test	
Sanitary		Flood Test	
Chilled Water		Vacuum Test	

Location	Floor
Dock Tower	First Floor

Equipment/Materials To Be Tested

Air-Conditioning Refrigeration Lines

Pipework Material

Copper	√	Upvc	
Galvanised Steel		Pex	
Stainless Steel		Brass	

Test Results (Air)		Test Result (Air)	
Ambient Temp	17	Ambient Temp	16
Initial Pressure (Bar)	42	Initial Pressure (Bar)	35
Test Duration (Hrs)	1	Test Duration (Hrs)	24
Final Reading (Bar)	42	Final Reading (Bar)	35

Remarks

All OK

Pressure Test Record Sheet

Climate Installations UK Ltd
75 Ashover Road
Old Tupton
Chesterfield
S42 6HQ
Mobile: 07975621747 / 07812521216
E-mail: climateinstallations@gmail.com

Client	Address
Winvic	
Contact:- Adam Soane	Winvic, Calder Park, Peel Avenue, Wakefield, WF2 7UA

System		Type Of Test	
Air-Conditioning	√	OFN Pressure Test	√
Ventilation		OFN Strength Test	√
Plumbing		Air Test	
Sanitary		Flood Test	
Chilled Water		Vacuum Test	

Location	Floor
Dock Tower	Ground Floor

Equipment/Materials To Be Tested

Air-Conditioning Refrigeration Lines

Pipework Material

Copper	√	Upvc	
Galvanised Steel		Pex	
Stainless Steel		Brass	

Test Results (Air)		Test Result (Air)	
Ambient Temp	17	Ambient Temp	16
Initial Pressure (Bar)	42	Initial Pressure (Bar)	35
Test Duration (Hrs)	1	Test Duration (Hrs)	24
Final Reading (Bar)	42	Final Reading (Bar)	35

Remarks

All OK

Pressure Test Record Sheet

Climate Installations UK Ltd
75 Ashover Road
Old Tupton
Chesterfield
S42 6HQ
Mobile: 07975621747 / 07812521216
E-mail: climateinstallations@gmail.com

Client	Address
Winvic	
Contact:- Adam Soane	Winvic, Calder Park, Peel Avenue, Wakefield, WF2 7UA

System		Type Of Test	
Air-Conditioning	√	OFN Pressure Test	√
Ventilation		OFN Strength Test	√
Plumbing		Air Test	
Sanitary		Flood Test	
Chilled Water		Vacuum Test	

Location	Floor
Main Office	Ground/First Floor

Equipment/Materials To Be Tested

Air-Conditioning Refrigeration Lines

Pipework Material

Copper	√	Upvc	
Galvanised Steel		Pex	
Stainless Steel		Brass	

Test Results (Air)		Test Result (Air)	
Ambient Temp	17	Ambient Temp	16
Initial Pressure (Bar)	42	Initial Pressure (Bar)	35
Test Duration (Hrs)	1	Test Duration (Hrs)	24
Final Reading (Bar)	42	Final Reading (Bar)	35

Remarks

All OK

Pressure Test Record Sheet

Climate Installations UK Ltd
75 Ashover Road
Old Tupton
Chesterfield
S42 6HQ
Mobile: 07975621747 / 07812521216
E-mail: climateinstallations@gmail.com

Client	Address
Winvic	
Contact:- Adam Soane	Winvic, Calder Park, Peel Avenue, Wakefield, WF2 7UA

System		Type Of Test	
Air-Conditioning	√	OFN Pressure Test	√
Ventilation		OFN Strength Test	√
Plumbing		Air Test	
Sanitary		Flood Test	
Chilled Water		Vacuum Test	

Location	Floor
Main Office	Second Floor

Equipment/Materials To Be Tested

Air-Conditioning Refrigeration Lines

Pipework Material

Copper	√	Upvc	
Galvanised Steel		Pex	
Stainless Steel		Brass	

Test Results (Air)		Test Result (Air)	
Ambient Temp	17	Ambient Temp	16
Initial Pressure (Bar)	42	Initial Pressure (Bar)	35
Test Duration (Hrs)	1	Test Duration (Hrs)	24
Final Reading (Bar)	42	Final Reading (Bar)	35

Remarks

All OK

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

COMMISSIONING & TEST REPORT

For the Attention of: Adam Soane

System: Dock Tower - MVHR Units

Contract: Calder Park - Wakefield

Client: Carter Electrical

Remarks:

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

WITNESSING OF COMMISSIONING AND TESTING

Witnessed by: _____

Representing: _____

Signature: _____

Date: _____

System: Dock Tower - MVHR Units

Contract: Calder Park - Wakefield

Client: Carter Electrical

Consultant: _____

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Dock Tower - MVHR Units
Contract:	Calder Park - Wakefield

PRE - COMMISSIONING CHECK LIST

With electrical supply isolated, check the following:	Y / N	Comments / follow-up reference
General Checks:		
1 Installation complete.	**Y**	Confirmed by: Client
2 Air leakage tests complete. (if applicable)	**N/A**	Confirmed by: Client
3 Branch regulating dampers open.	**N/A**	Confirmed by: JWN Commissioning Services
4 Grille/Diffuser regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
Electrical Checks:		
5 Power available	**Y**	Confirmed by: Client
6 Motor runs at or below FLC (inverter only)	**N/A**	Confirmed by: JWN Commissioning Services
Mechanical Checks:		
7 Fan chambers clean.	**Y**	Confirmed by: JWN Commissioning Services
8 Filters fitted.	**Y**	Confirmed by: JWN Commissioning Services
9 Inlet free from obstruction.	**Y**	Confirmed by: JWN Commissioning Services
10 Flexible connections airtight at fan	**N/A**	Confirmed by: JWN Commissioning Services
11 Pulleys aligned and belt tension correct.	**N/A**	Direct drive
12 Drive guard fitted.	**N/A**	Direct drive
13 Transit bolts removed.	**N/A**	Confirmed by: JWN Commissioning Services
14 Impellor free to rotate.	**N/A**	Confirmed by: JWN Commissioning Services
15 Unit dampers set to full fresh air	**N/A**	Confirmed by: JWN Commissioning Services
16 Fan type installed for correct air flow direction.	**Y**	Confirmed by: JWN Commissioning Services
17 Rotation of motor shaft is correct.	**N/A**	Confirmed by: JWN Commissioning Services
18 Motor, fan and drive are free from vibration and undue noise	**Y**	Confirmed by: JWN Commissioning Services

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Dock Tower - MVHR Units
Contract:	Calder Park - Wakefield

ENGINEERS REPORT

JWN Commissioning have completed the measurement of the MVHRS located within the Dock Tower, all recorded measurements can be found documented within this report.

Both MVHRS are controlled via local wall controllers, these have been enabled and set at both Speeds 1 & 2, volumes have then been documented.

No design volumes have been provided, therefore the Units have been measured in both Speeds 1 & 2.

JWN COMMISSIONING

Client:	Calder Park - Wakefield
System:	Dock Tower - MVHR Units
Contract:	Calder Park - Wakefield

BALOMETER TEST SHEET

		Design Data	Test Data			
Terminal Ref.	Location	Volume l/s	Indicated Volume l/s	Factor (if appl)	Final Volume l/s	% of Design
Ground:						
MVHR 06:	***Speed 1***					
SG 1	Dock Tower - Ground Floor	N/A	44	1.00	44	N/A
SG 2	Dock Tower - Ground Floor	N/A	40	1.00	40	N/A
MVHR 06:	***Speed 2***					
SG 1	Dock Tower - Ground Floor	N/A	57	1.00	57	N/A
SG 2	Dock Tower - Ground Floor	N/A	59	1.00	59	N/A
First Floor:						
MVHR 06:	***Speed 1***					
SG 1	Dock Tower - First Floor	N/A	53	1.00	53	N/A
SG 2	Dock Tower - First Floor	N/A	47	1.00	47	N/A
MVHR 06:	***Speed 2***					
SG 1	Dock Tower - First Floor	N/A	66	1.00	66	N/A
SG 2	Dock Tower - First Floor	N/A	70	1.00	70	N/A

Remarks:

Instruments used: Balometer

Date: 22/09/22	Engineer: J Nixon	Sht. No. 5 of 6

JWN COMMISSIONING

Client:	Carter Electrical
System:	Dock Tower - MVHR Units
Contract:	Calder Park - Wakefield

ANEMOMETER TEST SHEET

Design Data							Test Data		
Terminal Ref:	Location	Spigot size (mm)	Factor (if appl)	Factored/ Free Area m²	Volume m³/s	Velocity m/s	Final Velocity m/s	Volume m³/s	% of Design
MVHR 06:	***Speed 1***								
E B/M	Dock Tower - Ground Floor	300 Ø	1.00	0.071	N/A	N/A	1.90	0.135	N/A
MVHR 06:	***Speed 2***								
E B/M	Dock Tower - Ground Floor	300 Ø	1.00	0.071	N/A	N/A	2.20	0.156	N/A
MVHR 06:	***Speed 1***								
E B/M	Dock Tower - First Floor	300 Ø	1.00	0.071	N/A	N/A	1.60	0.114	N/A
MVHR 06:	***Speed 2***								
E B/M	Dock Tower - First Floor	300 Ø	1.00	0.071	N/A	N/A	2.10	0.149	N/A

Remarks:

Instruments used: Anemometer

Date: 22/09/22	Engineer: J Nixon	Sht. No. 6 of 6

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

COMMISSIONING & TEST REPORT

For the Attention of: Adam Soane

System: Extract Fan 01

Contract: Calder Park - Wakefield

Client: Carter Electrical

Remarks:

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

WITNESSING OF COMMISSIONING AND TESTING

Witnessed by: _____

Representing: _____

Signature: _____

Date: _____

System: Extract Fan 01

Contract: Calder Park - Wakefield

Client: Carter Electrical

Consultant: _____

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Extract Fan 01
Contract:	Calder Park - Wakefield

PRE - COMMISSIONING CHECK LIST

With electrical supply isolated, check the following:	Y / N	Comments / follow-up reference
General Checks:		
1 Installation complete.	**Y**	Confirmed by: Client
2 Air leakage tests complete. (if applicable)	**N/A**	Confirmed by: Client
3 Branch regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
4 Grille/Diffuser regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
Electrical Checks:		
5 Power available	**Y**	Confirmed by: Client
6 Motor runs at or below FLC (inverter only)	**N/A**	Confirmed by: JWN Commissioning Services
Mechanical Checks:		
7 Fan chambers clean.	**Y**	Confirmed by: JWN Commissioning Services
8 Filters fitted.	**N/A**	Confirmed by: JWN Commissioning Services
9 Inlet free from obstruction.	**Y**	Confirmed by: JWN Commissioning Services
10 Flexible connections airtight at fan	**Y**	Confirmed by: JWN Commissioning Services
11 Pulleys aligned and belt tension correct.	**N/A**	Direct drive
12 Drive guard fitted.	**N/A**	Direct drive
13 Transit bolts removed.	**N/A**	Confirmed by: JWN Commissioning Services
14 Impellor free to rotate.	**N/A**	Confirmed by: JWN Commissioning Services
15 Unit dampers set to full fresh air	**N/A**	Confirmed by: JWN Commissioning Services
16 Fan type installed for correct air flow direction.	**Y**	Confirmed by: JWN Commissioning Services
17 Rotation of motor shaft is correct.	**N/A**	Confirmed by: JWN Commissioning Services
18 Motor, fan and drive are free from vibration and undue noise	**Y**	Confirmed by: JWN Commissioning Services

Remarks:

ENGINEERS REPORT

JWN Commissioning have completed the proportional balance of EF 01 serving the Toilet Areas, all recorded measurements can be found documented within this report.

The Fan is currently operating at 110% of design volume running at maximum speed. A Proportional balance has been carried out across the floors by regulating the discs within the Air Valves.

A correction Factor of 0.96 has also been measured to an individual Air Valve and recorded within this report.

Fan Details:

Systemair KVK DUO 315 L

230v / 1Ph / 50Hz

1.96A / 0.448kW

JWN COMMISSIONING

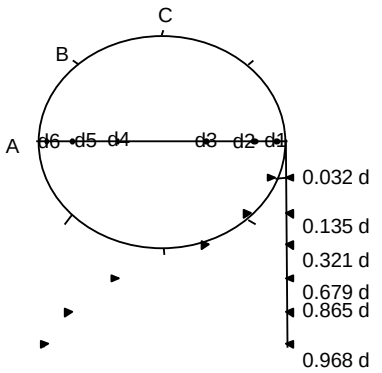
Client:	Carter Electrical
System:	Extract Fan 01
Contract:	Calder Park - Wakefield

DUCT VOLUME TEST SHEET

Test Point Location	Design Volume **m³/s**	Duct Dia. **mm**	Duct Area **m²**	Velocity **m/s**
Level 3 - Plant Deck	0.342	400	0.126	2.72

VELOCITY PROFILE (taken facing air flow)

UNITS = m/s



0.032 d	0.135 d	0.321 d	0.679 d	0.865 d	0.968 d	
3.00	3.22	3.17	2.88	2.94	2.86	**A**
						B
2.88	2.90	3.00	2.78	3.05	3.10	**C**
			Total of velocities:		35.78	

Average velocity - **m/s**	Test Volume - **m³/s**	% of Design	Static Pressure - **Pa**
2.98	0.375	110	117

Remarks: **Traverse Serves as Extract Fan 01 Total System Volume**

Instruments used: Micromanometer / Pitot Tube

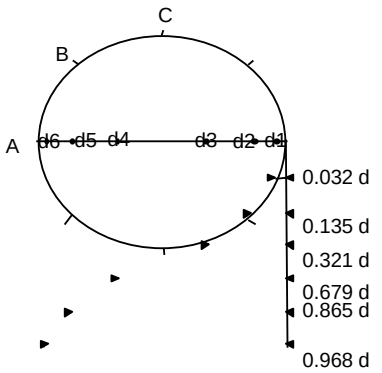
JWN COMMISSIONING

Client:	Carter Electrical
System:	Extract Fan 01
Contract:	Calder Park - Wakefield

DUCT VOLUME TEST SHEET

Test Point Location	Design Volume **m³/s**	Duct Dia. **mm**	Duct Area **m²**	Velocity **m/s**
Level 2 - Male WC	0.016	100	0.008	2.04

VELOCITY PROFILE (taken facing air flow) **UNITS = m/s**



0.032 d	0.135 d	0.321 d	0.679 d	0.865 d	0.968 d	
						A
						B
2.67	2.75					**C**
				Total of velocities:	5.42	

Average velocity - **m/s**	Test Volume - **m³/s**	% of Design	Static Pressure - **Pa**
2.71	0.022	138	72

Remarks: **Traverse Serves as Extract Air Valve Correction Factor**

Correction Factor = Actual / Indicated

Actual: 0.022m³/s

Indicated: 0.023m³/s

Correction Factor: **0.96**

Instruments used: Micromanometer / Pitot Tube

Date: 21/09/22 | Engineer: J Nixon | Sht. No. 6 of 7

JWN COMMISSIONING

Client:	Carter Electrical
System:	Extract Fan 01
Contract:	Calder Park - Wakefield

ANEMOMETER TEST SHEET

Design Data							Test Data		
Terminal Ref:	Location	Spigot size (mm)	Factor (if appl)	Factored/ Free Area m²	Volume m³/s	Velocity m/s	Final Velocity m/s	Volume m³/s	% of Design
Level 2:									
EG 03	Level 2 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.20	0.017	106
EG 03	Level 2 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.15	0.017	103
EG 03	Level 2 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.17	0.017	104
EG 05	Level 2 Disabled WC	100 Ø	0.96	0.008	0.016	2.08	2.10	0.016	101
EG 04	Level 2 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.33	0.018	108
EG 04	Level 2 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.27	0.017	106
EG 04	Level 2 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.30	0.018	107
Level 1:									
EG 03	Level 1 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.26	0.017	108
EG 03	Level 1 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.09	0.016	100
EG 03	Level 1 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.11	0.016	101
EG 05	Level 1 Disabled Wc	100 Ø	0.96	0.008	0.016	2.08	2.18	0.017	105
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.28	0.018	106
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.30	0.018	107
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.35	0.018	109
Ground:									
EG 03	Ground Floor Male WC	100 Ø	0.96	0.008	0.016	2.08	2.15	0.017	103
EG 03	Ground Floor Male WC	100 Ø	0.96	0.008	0.016	2.08	2.20	0.017	106
EG 03	Ground Floor Male WC	100 Ø	0.96	0.008	0.016	2.08	2.17	0.017	104
EG 05	Level 1 Disabled Wc	100 Ø	0.96	0.008	0.016	2.08	2.25	0.017	108
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.18	0.017	101
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.11	0.016	98
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.20	0.017	102
EG 01	Ground Floor Cleaners	100 Ø	0.96	0.008	0.016	2.08	2.08	0.016	100

Remarks:

Instruments used: Anemometer

Date: 21/09/22	Engineer: J Nixon	Sht. No. 7 of 7

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

COMMISSIONING & TEST REPORT

For the Attention of: Adam Soane

System: Extract Fan 02 - Dock Tower

Contract: Calder Park - Wakefield

Client: Carter Electrical

Remarks:

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

WITNESSING OF COMMISSIONING AND TESTING

Witnessed by: _____

Representing: _____

Signature: _____

Date: _____

System: Extract Fan 02 - Dock Tower

Contract: Calder Park - Wakefield

Client: Carter Electrical

Consultant: _____

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Extract Fan 02 - Dock Tower
Contract:	Calder Park - Wakefield

PRE - COMMISSIONING CHECK LIST

With electrical supply isolated, check the following:	Y / N	Comments / follow-up reference
General Checks:		
1 Installation complete.	**Y**	Confirmed by: Client
2 Air leakage tests complete. (if applicable)	**N/A**	Confirmed by: Client
3 Branch regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
4 Grille/Diffuser regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
Electrical Checks:		
5 Power available	**Y**	Confirmed by: Client
6 Motor runs at or below FLC (inverter only)	**N/A**	Confirmed by: JWN Commissioning Services
Mechanical Checks:		
7 Fan chambers clean.	**Y**	Confirmed by: JWN Commissioning Services
8 Filters fitted.	**N/A**	Confirmed by: JWN Commissioning Services
9 Inlet free from obstruction.	**Y**	Confirmed by: JWN Commissioning Services
10 Flexible connections airtight at fan	**Y**	Confirmed by: JWN Commissioning Services
11 Pulleys aligned and belt tension correct.	**N/A**	Direct drive
12 Drive guard fitted.	**N/A**	Direct drive
13 Transit bolts removed.	**N/A**	Confirmed by: JWN Commissioning Services
14 Impellor free to rotate.	**N/A**	Confirmed by: JWN Commissioning Services
15 Unit dampers set to full fresh air	**N/A**	Confirmed by: JWN Commissioning Services
16 Fan type installed for correct air flow direction.	**Y**	Confirmed by: JWN Commissioning Services
17 Rotation of motor shaft is correct.	**N/A**	Confirmed by: JWN Commissioning Services
18 Motor, fan and drive are free from vibration and undue noise	**Y**	Confirmed by: JWN Commissioning Services

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Extract Fan 02 - Dock Tower
Contract:	Calder Park - Wakefield

ENGINEERS REPORT

JWN Commissioning have completed the proportional balance of EF 02 serving the Toilet Areas, all recorded measurements can be found documented within this report.

No Design volumes have been provided, therefore the designs from EF 01 have been untilised. All Grilles are achieving the required volume of 16l/s.

Fan Setpoint - Speed 9

JWN COMMISSIONING

Client:	Carter Electrical
System:	Extract Fan 02 - Dock Tower
Contract:	Calder Park - Wakefield

ANEMOMETER TEST SHEET

Design Data							Test Data		
Terminal Ref:	Location	Spigot size (mm)	Factor (if appl)	Factored/ Free Area m²	Volume m³/s	Velocity m/s	Final Velocity m/s	Volume m³/s	% of Design
EG 01	Cleaners	100 Ø	0.96	0.008	0.016	2.08	2.11	0.016	101
EG 02	WC	100 Ø	0.96	0.008	0.016	2.08	2.15	0.017	103
EG 03	WC	100 Ø	0.96	0.008	0.016	2.08	2.17	0.017	104
Level 1:									
EG 03	Level 1 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.26	0.017	108
EG 03	Level 1 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.09	0.016	100
EG 03	Level 1 Male WC	100 Ø	0.96	0.008	0.016	2.08	2.11	0.016	101
EG 05	Level 1 Disabled Wc	100 Ø	0.96	0.008	0.016	2.08	2.18	0.017	105
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.28	0.018	106
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.30	0.018	107
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.35	0.018	109
Ground:									
EG 03	Ground Floor Male WC	100 Ø	0.96	0.008	0.016	2.08	2.15	0.017	103
EG 03	Ground Floor Male WC	100 Ø	0.96	0.008	0.016	2.08	2.20	0.017	106
EG 03	Ground Floor Male WC	100 Ø	0.96	0.008	0.016	2.08	2.17	0.017	104
EG 05	Level 1 Disabled Wc	100 Ø	0.96	0.008	0.016	2.08	2.25	0.017	108
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.18	0.017	101
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.11	0.016	98
EG 04	Level 1 Female WC	100 Ø	0.96	0.008	0.0165	2.15	2.20	0.017	102
EG 01	Ground Floor Cleaners	100 Ø	0.96	0.008	0.016	2.08	2.08	0.016	100

Remarks:

Instruments used: Anemometer

Date:	22/09/22	Engineer:	J Nixon	Sht. No.	5 of 5

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

COMMISSIONING & TEST REPORT

For the Attention of: Adam Soane

System: Fan Coil Unit - Secondary Air

Contract: Calder Park - Wakefield

Client: Carter Electrical

Remarks:

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

WITNESSING OF COMMISSIONING AND TESTING

Witnessed by: _____

Representing: _____

Signature: _____

Date: _____

System: Fan Coil Unit - Secondary Air

Contract: Calder Park - Wakefield

Client: Carter Electrical

Consultant: _____

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Fan Coil Unit - Secondary Air
Contract:	Calder Park - Wakefield

PRE - COMMISSIONING CHECK LIST

With electrical supply isolated, check the following:	Y / N	Comments / follow-up reference
General Checks:		
1 Installation complete.	**Y**	Confirmed by: Client
2 Air leakage tests complete. (if applicable)	**N/A**	Confirmed by: Client
3 Branch regulating dampers open.	**N/A**	Confirmed by: JWN Commissioning Services
4 Grille/Diffuser regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
Electrical Checks:		
5 Power available	**Y**	Confirmed by: Client
6 Motor runs at or below FLC (inverter only)	**N/A**	Confirmed by: JWN Commissioning Services
Mechanical Checks:		
7 Fan chambers clean.	**Y**	Confirmed by: JWN Commissioning Services
8 Filters fitted.	**Y**	Confirmed by: JWN Commissioning Services
9 Inlet free from obstruction.	**Y**	Confirmed by: JWN Commissioning Services
10 Flexible connections airtight at fan	**N/A**	Confirmed by: JWN Commissioning Services
11 Pulleys aligned and belt tension correct.	**N/A**	Direct drive
12 Drive guard fitted.	**N/A**	Direct drive
13 Transit bolts removed.	**N/A**	Confirmed by: JWN Commissioning Services
14 Impellor free to rotate.	**N/A**	Confirmed by: JWN Commissioning Services
15 Unit dampers set to full fresh air	**N/A**	Confirmed by: JWN Commissioning Services
16 Fan type installed for correct air flow direction.	**Y**	Confirmed by: JWN Commissioning Services
17 Rotation of motor shaft is correct.	**N/A**	Confirmed by: JWN Commissioning Services
18 Motor, fan and drive are free from vibration and undue noise	**Y**	Confirmed by: JWN Commissioning Services

Remarks:

ENGINEERS REPORT

JWN Commissioning have completed the proportional balance of the Secondary Air Grilles served from the Fan Coil Units, all recorded measurements can be found documented within this report.

FCUS are controlled via a centralised controller located within the reception area, prior to any balancing works taking the place the units were put into "Fan Mode" with a Setpoint of **Speed 2.**

A balance was then carried out by regulating the VCDS installed to each supply grille.

As per the Carter Schematic the majority of the FCUS are designed at 100l/s per grille, the only exception to this are the units that show there being three grilles but 2 grilles have actually been installed, therefore the volume of 300l/s is then split between the two grilles instaed of 3.

As noted within the report the FCUS are operating above the required design volumes. Spot Checks were carried out with all units running in Speed 1, however at this setpoint the Grilles drop below design volume.

When the Building is fully handed over the FCUS will run in either Heating or Cooling and will control dependant on the required temperature setpoint.

Due to the area being open plan a 20% balance has been allowed for across the Grilles as per the industry guidelines.

JWN COMMISSIONING

Client:	Calder Park - Wakefield
System:	Fan Coil Unit - Secondary Air
Contract:	Calder Park - Wakefield

BALOMETER TEST SHEET

		Design Data	Test Data			
Terminal Ref.	Location	Volume l/s	Indicated Volume l/s	Factor (if appl)	Final Volume l/s	% of Design
Level 2:						
FCU 11:						
SG 1	Level 2 Open Area	150	187	1.00	187	125
SG 2	Level 2 Open Area	150	195	1.00	195	130
FCU 12:						
SG 1	Level 2 Open Area	100	120	1.00	120	120
SG 2	Level 2 Open Area	100	118	1.00	118	118
SG 3	Level 2 Open Area	100	130	1.00	130	130
FCU 13:						
SG 1	Level 2 Open Area	100	135	1.00	135	135
SG 2	Level 2 Open Area	100	135	1.00	135	135
SG 3	Level 2 Open Area	100	122	1.00	122	122
FCU 14:						
SG 1	Level 2 Open Area	100	156	1.00	156	156
SG 2	Level 2 Open Area	100	156	1.00	156	156
SG 3	Level 2 Open Area	100	148	1.00	148	148
FCU 15:						
SG 1	Level 2 Open Area	100	126	1.00	126	126
SG 2	Level 2 Open Area	100	140	1.00	140	140
SG 3	Level 2 Open Area	100	122	1.00	122	122
FCU 16:						
SG 1	Level 2 Open Area	100	126	1.00	126	126
SG 2	Level 2 Open Area	100	133	1.00	133	133
SG 3	Level 2 Open Area	100	120	1.00	120	120

Remarks:

Instruments used: Balometer

Date: 22/09/22	Engineer: J Nixon	Sht. No. 5 of 9

JWN COMMISSIONING

Client:	Calder Park - Wakefield
System:	Fan Coil Unit - Secondary Air
Contract:	Calder Park - Wakefield

BALOMETER TEST SHEET

		Design Data	Test Data			
Terminal Ref.	Location	Volume l/s	Indicated Volume l/s	Factor (if appl)	Final Volume l/s	% of Design
FCU 17:						
SG 1	Level 2 Open Area	100	125	1.00	125	125
SG 2	Level 2 Open Area	100	134	1.00	134	134
SG 3	Level 2 Open Area	100	126	1.00	126	126
FCU 18:						
SG 1	Level 2 Open Area	100	120	1.00	120	120
SG 2	Level 2 Open Area	100	123	1.00	123	123
SG 3	Level 2 Open Area	100	118	1.00	118	118
FCU 19:						
SG 1	Level 2 Open Area	100	140	1.00	140	140
SG 2	Level 2 Open Area	100	147	1.00	147	147
SG 3	Level 2 Open Area	100	130	1.00	130	130

Remarks:

Instruments used: Balometer

Date: 22/09/22	Engineer: J Nixon	Sht. No. 6 of 9

JWN COMMISSIONING

Client:	Calder Park - Wakefield
System:	Fan Coil Unit - Secondary Air
Contract:	Calder Park - Wakefield

BALOMETER TEST SHEET

		Design Data	Test Data			
Terminal Ref.	Location	Volume l/s	Indicated Volume l/s	Factor (if appl)	Final Volume l/s	% of Design
Level 1:						
FCU 02:						
SG 1	Level 1 Open Area	150	190	1.00	190	127
SG 2	Level 1 Open Area	150	202	1.00	202	135
FCU 03:						
SG 1	Level 1 Open Area	100	105	1.00	105	105
SG 2	Level 1 Open Area	100	99	1.00	99	99
SG 3	Level 1 Open Area	100	108	1.00	108	108
FCU 04:						
SG 1	Level 1 Open Area	100	128	1.00	128	128
SG 2	Level 1 Open Area	100	119	1.00	119	119
SG 3	Level 1 Open Area	100	120	1.00	120	120
FCU 05:						
SG 1	Level 1 Open Area	100	126	1.00	126	126
SG 2	Level 1 Open Area	100	130	1.00	130	130
SG 3	Level 1 Open Area	100	125	1.00	125	125
FCU 06:						
SG 1	Level 1 Open Area	100	126	1.00	126	126
SG 2	Level 1 Open Area	100	133	1.00	133	133
SG 3	Level 1 Open Area	100	130	1.00	130	130
FCU 07:						
SG 1	Level 1 Open Area	100	134	1.00	134	134
SG 2	Level 1 Open Area	100	128	1.00	128	128
SG 3	Level 1 Open Area	100	132	1.00	132	132

Remarks:

Instruments used: Balometer

Date: 22/09/22	Engineer: J Nixon	Sht. No. 7 of 9

JWN COMMISSIONING

Client:	Calder Park - Wakefield
System:	Fan Coil Unit - Secondary Air
Contract:	Calder Park - Wakefield

BALOMETER TEST SHEET

		Design Data	Test Data			
Terminal Ref.	Location	Volume l/s	Indicated Volume l/s	Factor (if appl)	Final Volume l/s	% of Design
FCU 08:						
SG 1	Level 1 Open Area	100	131	1.00	131	131
SG 2	Level 1 Open Area	100	134	1.00	134	134
SG 3	Level 1 Open Area	100	135	1.00	135	135
FCU 09:						
SG 1	Level 1 Open Area	100	130	1.00	130	130
SG 2	Level 1 Open Area	100	122	1.00	122	122
SG 3	Level 1 Open Area	100	118	1.00	118	118
FCU 10:						
SG 1	Level 1 Open Area	100	142	1.00	142	142
SG 2	Level 1 Open Area	100	141	1.00	141	141
SG 3	Level 1 Open Area	100	122	1.00	122	122

Remarks:

Instruments used: Balometer

Date: 22/09/22	Engineer: J Nixon	Sht. No. 8 of 9

JWN COMMISSIONING

Client:	Calder Park - Wakefield
System:	Fan Coil Unit - Secondary Air
Contract:	Calder Park - Wakefield

BALOMETER TEST SHEET

		Design Data	Test Data			
Terminal Ref.	Location	Volume l/s	Indicated Volume l/s	Factor (if appl)	Final Volume l/s	% of Design
Ground:						
FCU 01:						
SG 1	Reception	150	301	1.00	301	201
SG 2	Reception	150	313	1.00	313	209

Remarks:

Instruments used: Balometer

Date: 22/09/22	Engineer: J Nixon	Sht. No. 9 of 9

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

COMMISSIONING & TEST REPORT

For the Attention of: Adam Soane

System: Level 1 - MVHR Primary Air

Contract: Calder Park - Wakefield

Client: Carter Electrical

Remarks:

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

WITNESSING OF COMMISSIONING AND TESTING

Witnessed by: _____

Representing: _____

Signature: _____

Date: _____

System: Level 1 - MVHR Primary Air

Contract: Calder Park - Wakefield

Client: Carter Electrical

Consultant: _____

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Level 1 - MVHR Primary Air
Contract:	Calder Park - Wakefield

PRE - COMMISSIONING CHECK LIST

With electrical supply isolated, check the following:	Y / N	Comments / follow-up reference
General Checks:		
1 Installation complete.	**Y**	Confirmed by: Client
2 Air leakage tests complete. (if applicable)	**N/A**	Confirmed by: Client
3 Branch regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
4 Grille/Diffuser regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
Electrical Checks:		
5 Power available	**Y**	Confirmed by: Client
6 Motor runs at or below FLC (inverter only)	**N/A**	Confirmed by: JWN Commissioning Services
Mechanical Checks:		
7 Fan chambers clean.	**Y**	Confirmed by: JWN Commissioning Services
8 Filters fitted.	**Y**	Confirmed by: JWN Commissioning Services
9 Inlet free from obstruction.	**Y**	Confirmed by: JWN Commissioning Services
10 Flexible connections airtight at fan	**N/A**	Confirmed by: JWN Commissioning Services
11 Pulleys aligned and belt tension correct.	**N/A**	Direct drive
12 Drive guard fitted.	**N/A**	Direct drive
13 Transit bolts removed.	**N/A**	Confirmed by: JWN Commissioning Services
14 Impellor free to rotate.	**N/A**	Confirmed by: JWN Commissioning Services
15 Unit dampers set to full fresh air	**N/A**	Confirmed by: JWN Commissioning Services
16 Fan type installed for correct air flow direction.	**Y**	Confirmed by: JWN Commissioning Services
17 Rotation of motor shaft is correct.	**N/A**	Confirmed by: JWN Commissioning Services
18 Motor, fan and drive are free from vibration and undue noise	**Y**	Confirmed by: JWN Commissioning Services

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Level 1 - MVHR Primary Air
Contract:	Calder Park - Wakefield

ENGINEERS REPORT

JWN Commissioning have completed the measurement / proportional balance of the MVHRS serving the Primary Air on Level 1, all recorded measurements can be found documented within this report.

The MVHRS are controlled via the Centralised Controller located within the Ground Floor Reception Area, the Fans are Currently Running in Normal Operation.

The supply side of the MVHRS serve as the Primary Fresh Air to the back of each Fan Coil Unit, a proportional balance has been carried out by regulating each of the VCDS serving the Spigots.

A Correction Factor has been recorded on the Primary Fresh Air Supply, therefore in order to obtain the total system volume the measured volumes can be summated to obtain the total measured system volume.

Each MVHR has x1 Extract Bellmouth located above the ceiling which is acting as the return air path, each of the Bellmouths have been measured and the indicated volume recorded.

All Spigots / Bellmouths are currently oiperating at the required design volume.

MVHR Details:

Daikin VAM1500J

JWN COMMISSIONING

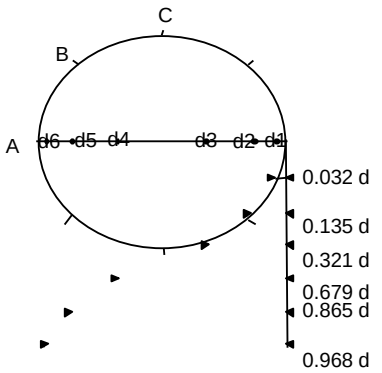
Client:	Carter Electrical
System:	Level 1 - MVHR Primary Air
Contract:	Calder Park - Wakefield

DUCT VOLUME TEST SHEET

Test Point Location	Design Volume **m³/s**	Duct Dia. **mm**	Duct Area **m²**	Velocity **m/s**
Fresh Air Spigot 11	0.061	200	0.031	1.94

VELOCITY PROFILE (taken facing air flow)

UNITS = m/s



0.032 d	**0.135 d**	**0.321 d**	**0.679 d**	**0.865 d**	**0.968 d**	
1.79	2.13	2.32	2.08	1.77	1.63	**A**
						B
1.60	1.88	2.39	2.25	1.86	2.13	**C**
			Total of velocities:		23.83	

Average velocity - **m/s**	Test Volume - **m³/s**	% of Design	Static Pressure - **Pa**
1.99	0.062	102	5

Remarks: **Traverse serves as Supply Fresh Air Spigot Correction Factor:**

Correction Factor = Actual / Indicated

Actual: 0.062m³/s

Indicated: 0.077m³/s

Correction Factor: **0.81** - Factor Applied to Free Area of all Fresh Air Spigots

Instruments used: Micromanometer / Pitot Tube

Date: 21/09/22	Engineer: J Nixon	Sht. No. 5 of 6

JWN COMMISSIONING

Client:	Carter Electrical
System:	Level 1 - MVHR Primary Air
Contract:	Calder Park - Wakefield

ANEMOMETER TEST SHEET

Design Data							Test Data		
Terminal Ref:	Location	Spigot size (mm)	Factor (if appl)	Factored/ Free Area m²	Volume m³/s	Velocity m/s	Final Velocity m/s	Volume m³/s	% of Design
MVHR 01:									
FCU 01	G/F Meeting / Breakout	200 Ø	0.81	0.025	0.060	2.40	2.44	0.061	102
FCU 02	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.60	0.065	107
FCU 03	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.54	0.064	104
FCU 04	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.50	0.063	102
FCU 05	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.61	0.065	107
FCU 06	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.67	0.067	109
Extract	Level 1 Open Area	400 Ø	1.00	0.126	0.305	2.42	2.60	0.328	107
MVHR 02:									
FCU 07	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.65	0.066	109
FCU 08	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.52	0.063	103
FCU 09	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.55	0.064	105
FCU 10	Level 1 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.60	0.065	107
Extract	Level 1 Open Area	400 Ø	1.00	0.126	0.310	2.47	2.52	0.317	102
Extract	G/F Meeting / Breakout	300 Ø	1.00	0.071	0.060	0.85	0.90	0.064	107

Remarks:

Instruments used: Anemometer

Date: 21/09/22	Engineer: J Nixon	Sht. No. 6 of 6

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

COMMISSIONING & TEST REPORT

For the Attention of: Adam Soane

System: Level 2 - MVHR Primary Air

Contract: Calder Park - Wakefield

Client: Carter Electrical

Remarks:

Certificate of Analysis

Customer

P&A Environmental Limited
26 Berrycroft Lane
Romiley
SK6 4AU

Sample Date:* 22/09/2022
Sample Received: 22/09/2022
Analysis Commenced: 22/09/2022
Analysis Complete: 25/09/2022
Order No:*
Job No: 22-96844

Site Name:* CALDER PARK WAKEFIELD
Sampled By:* P FERNLEY

Lab Sample Number	Sample Description*	Deviation Codes	Other ID*	Sample Type*	Sampled Time*	Temp*	TVC - 22°C 3 days cfu/mL AM-01	TVC - 37°C 2 days cfu/mL AM-01	E.coli cfu/100mL AM-02	Total Coliforms cfu/100mL AM-02	Pseudomonas aeruginosa cfu/100mL AM-05
7028193	OFFICE KITCHEN HWS		1	DW	1000	N/A	0	2	0	0	0
7028194	OFFICE KITCHEN CWS		2	DW	1000	N/A	0	0	0	0	0
7028195	GATEHOUSE MCWS		3	DW	1000	N/A	0	0	0	0	0
7028196	HUB MCWS		4	DW	1000	N/A	0	0	0	0	0

Approved by:

Paula Nieto (Laboratory Manager)
Date of Issue: 26/09/2022

Tests marked $ in this report are subcontracted. Results of D or ND are Detected or Not Detected. Tests marked # in this report are not included in the UKAS Accreditation Schedule for our Laboratory. Deviation Codes: A - No Sample Date provided, B - No Sample Time Provided, C - Sample provided in wrong container, F - Exceeds Sampling to Receipt Time, G - Sample Tested Outside of Permitted Times. Sampling, opinions and interpretations expressed herein are outside the scope of UKAS accreditation. Method details and performance characteristics are available on request. < = Less than, > = greater than. All client supplied data is outside our scope and can affect the validity of results. This includes sampling date/time, sample location and items marked *. TVC analysis with results >300cfu/ml and Pseudomonas species >100cfu/100ml are regarded as an estimate determined by calculation. Legionella Limit of Detection is 100cfu/L. Please refer to your SLA/supplementary documentation regarding Statements of Conformity and Decision rules applied. Please refer to your UoM supplementary documentation regarding Uncertainty of Measurement for all analytical methods. Results relate only to the items tested. Results apply to the sample(s) as received. Sampling procedures employed are outside the scope of this UKAS accreditation. This certificate shall not be reproduced, except in full, without permission of the laboratory. Registered in England and Wales No. 11506820.

UKAS TESTING
7620

Testing Laboratory
Alpha Scientific,Unit 20 Agecroft Enterprise Park, Shearer Way, Swinton, Manchester, M27 8WA, c.services@alpha scientific.co.uk

Certificate of Analysis

Customer

P&A Environmental Limited
26 Berrycroft Lane
Romiley
SK6 4AU

Sample Date:* 22/09/2022
Sample Received: 22/09/2022
Analysis Commenced: 22/09/2022
Analysis Complete: 25/09/2022
Order No:*
Job No: 22-96844

Site Name:* CALDER PARK WAKEFIELD
Sampled By:* P FERNLEY

Lab Sample Number	Sample Description*	Deviation Codes	Other ID*	Sample Type*	Sampled Time*	Temp*	TVC - 22°C 3 days cfu/mL AM-01	TVC - 37°C 2 days cfu/mL AM-01	E.coli cfu/100mL AM-02	Total Coliforms cfu/100mL AM-02	Pseudomonas aeruginosa cfu/100mL AM-05
7028193	OFFICE KITCHEN HWS		1	DW	1000	N/A	0	2	0	0	0
7028194	OFFICE KITCHEN CWS		2	DW	1000	N/A	0	0	0	0	0
7028195	GATEHOUSE MCWS		3	DW	1000	N/A	0	0	0	0	0
7028196	HUB MCWS		4	DW	1000	N/A	0	0	0	0	0

Approved by:

Paula Nieto (Laboratory Manager)
Date of Issue: 26/09/2022

Tests marked $ in this report are subcontracted. Results of D or ND are Detected or Not Detected. Tests marked # in this report are not included in the UKAS Accreditation Schedule for our Laboratory. Deviation Codes: A - No Sample Date provided, B - No Sample Time Provided, C - Sample provided in wrong container, F - Exceeds Sampling to Receipt Time, G - Sample Tested Outside of Permitted Times. Sampling, opinions and interpretations expressed herein are outside the scope of UKAS accreditation. Method details and performance characteristics are available on request. < = Less than, > = greater than. All client supplied data is outside our scope and can affect the validity of results. This includes sampling date/time, sample location and items marked *. TVC analysis with results >300cfu/ml and Pseudomonas species >100cfu/100ml are regarded as an estimate determined by calculation. Legionella Limit of Detection is 100cfu/L. Please refer to your SLA/supplementary documentation regarding Statements of Conformity and Decision rules applied. Please refer to your UoM supplementary documentation regarding Uncertainty of Measurement for all analytical methods. Results relate only to the items tested. Results apply to the sample(s) as received. Sampling procedures employed are outside the scope of this UKAS accreditation. This certificate shall not be reproduced, except in full, without permission of the laboratory. Registered in England and Wales No. 11506820.

UKAS TESTING
7620

Testing Laboratory
Alpha Scientific,Unit 20 Agecroft Enterprise Park, Shearer Way, Swinton, Manchester, M27 8WA, c.services@alpha scientific.co.uk

9 Valentines Road
Atherton, Manchester
Tel : 07976 500 044
Email : jwncommissioningservices@gmail.com

WITNESSING OF COMMISSIONING AND TESTING

Witnessed by: _____

Representing: _____

Signature: _____

Date: _____

System: Level 2 - MVHR Primary Air

Contract: Calder Park - Wakefield

Client: Carter Electrical

Consultant: _____

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Level 2 - MVHR Primary Air
Contract:	Calder Park - Wakefield

PRE - COMMISSIONING CHECK LIST

With electrical supply isolated, check the following:	Y / N	Comments / follow-up reference
General Checks:		
1 Installation complete.	**Y**	Confirmed by: Client
2 Air leakage tests complete. (if applicable)	**N/A**	Confirmed by: Client
3 Branch regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
4 Grille/Diffuser regulating dampers open.	**Y**	Confirmed by: JWN Commissioning Services
Electrical Checks:		
5 Power available	**Y**	Confirmed by: Client
6 Motor runs at or below FLC (inverter only)	**N/A**	Confirmed by: JWN Commissioning Services
Mechanical Checks:		
7 Fan chambers clean.	**Y**	Confirmed by: JWN Commissioning Services
8 Filters fitted.	**Y**	Confirmed by: JWN Commissioning Services
9 Inlet free from obstruction.	**Y**	Confirmed by: JWN Commissioning Services
10 Flexible connections airtight at fan	**N/A**	Confirmed by: JWN Commissioning Services
11 Pulleys aligned and belt tension correct.	**N/A**	Direct drive
12 Drive guard fitted.	**N/A**	Direct drive
13 Transit bolts removed.	**N/A**	Confirmed by: JWN Commissioning Services
14 Impellor free to rotate.	**N/A**	Confirmed by: JWN Commissioning Services
15 Unit dampers set to full fresh air	**N/A**	Confirmed by: JWN Commissioning Services
16 Fan type installed for correct air flow direction.	**Y**	Confirmed by: JWN Commissioning Services
17 Rotation of motor shaft is correct.	**N/A**	Confirmed by: JWN Commissioning Services
18 Motor, fan and drive are free from vibration and undue noise	**Y**	Confirmed by: JWN Commissioning Services

Remarks:

JWN COMMISSIONING

Client:	Carter Electrical
System:	Level 2 - MVHR Primary Air
Contract:	Calder Park - Wakefield

ENGINEERS REPORT

JWN Commissioning have completed the measurement / proportional balance of the MVHRS serving the Primary Air on Level 2, all recorded measurements can be found documented within this report.

The MVHRS are controlled via the Centralised Controller located within the Ground Floor Reception Area, the Fans are Currently Running in Normal Operation.

The supply side of the MVHRS serve as the Primary Fresh Air to the back of each Fan Coil Unit, a proportional balance has been carried out by regulating each of the VCDS serving the Spigots.

A Correction Factor has been recorded on the Primary Fresh Air Supply, therefore in order to obtain the total system volume the measured volumes can be summated to obtain the total measured system volume.

Each MVHR has x1 Extract Bellmouth located above the ceiling which is acting as the return air path, each of the Bellmouths have been measured and the indicated volume recorded.

All Spigots / Bellmouths are currently oiperating at the required design volume.

MVHR Details:

Daikin VAM1500J

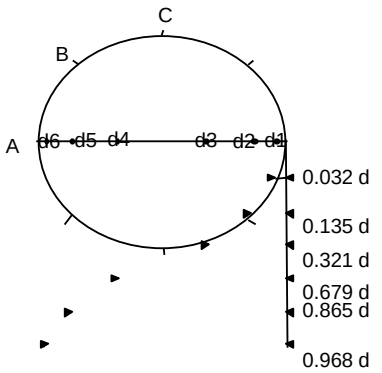
JWN COMMISSIONING

Client:	Carter Electrical
System:	Level 2 - MVHR Primary Air
Contract:	Calder Park - Wakefield

DUCT VOLUME TEST SHEET

Test Point Location	Design Volume **m³/s**	Duct Dia. **mm**	Duct Area **m²**	Velocity **m/s**
Fresh Air Spigot 11	0.061	200	0.031	1.94

VELOCITY PROFILE (taken facing air flow) **UNITS = m/s**



0.032 d	0.135 d	0.321 d	0.679 d	0.865 d	0.968 d	
1.79	2.13	2.32	2.08	1.77	1.63	**A**
						B
1.60	1.88	2.39	2.25	1.86	2.13	**C**
			Total of velocities:		23.83	

Average velocity - **m/s**	Test Volume - **m³/s**	% of Design	Static Pressure - **Pa**
1.99	0.062	102	5

Remarks: **Traverse serves as Supply Fresh Air Spigot Correction Factor:**

Correction Factor = Actual / Indicated

Actual: 0.062m³/s

Indicated: 0.077m³/s

Correction Factor: **0.81** - Factor Applied to Free Area of all Fresh Air Spigots

Instruments used: Micromanometer / Pitot Tube

JWN COMMISSIONING

Client:	Carter Electrical
System:	Level 2 - MVHR Primary Air
Contract:	Calder Park - Wakefield

ANEMOMETER TEST SHEET

Design Data							Test Data		
Terminal Ref:	Location	Spigot size (mm)	Factor (if appl)	Factored/ Free Area m²	Volume m³/s	Velocity m/s	Final Velocity m/s	Volume m³/s	% of Design
MVHR 03:									
FCU 11	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.66	0.067	109
FCU 12	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.57	0.064	105
FCU 13	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.48	0.062	102
FCU 14	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.56	0.064	105
FCU 15	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.66	0.067	109
Extract	Level 2 Open Area	400 Ø	1.00	0.126	0.305	2.43	2.65	0.333	109
MVHR 03:									
FCU 16	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.50	0.063	102
FCU 17	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.47	0.062	101
FCU 18	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.65	0.066	109
FCU 19	Level 2 Open Area	200 Ø	0.81	0.025	0.061	2.44	2.58	0.065	106
Extract	Level 2 Open Area	400 Ø	1.00	0.126	0.310	2.47	2.55	0.320	103

Remarks:

Instruments used: Anemometer

Date:	21/09/22	Engineer:	J Nixon	Sht. No.	6 of 6

Form: MPF 5.6
Issue: C

Operations

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP
Project Name -	Calder Park, Wakefield

Client -	Carter Electrical Services
Supply Voltage -	230vAC
Full Load Current -	1.5AMP (Approx)
Locks Type -	(•) [/] Eldon AMLS 3530 [/] 2 Keys Sent with Panel ( ) [ ] Eldon AMLS 3230 [ ] Other Specify _____
Specified Other -	N/A
Date Of Test -	19-4-22
Control Panel Serial No -	EMCP

Test Engineer's Signature -	
External Witness Signature if Applicable -	N/A
Panel Despatched With As Manufactured Drawings Ref -	[/] YES [ ] NO

IBMS

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

Visual Tests	Inspection Result				Notes
PANEL SPECIFICATION BY -	☐	IBMS	☑	Client	
MOUNTING -	☑	Wall	☐	Floor	
ENVIRONMENT -	☑	Indoor	☐	Out Door	
FIXINGS -	☑	Passed	☐	Not Applicable	
COLOUR CHECK -	☑	Passed	☐	Not Applicable	
PAINT WORK CHECK -	☑	Passed	☐	Not Applicable	
DOOR CLOSING CHECK -	☑	Passed	☐	Not Applicable	
DOOR LOCKING CHECK -	☑	Passed	☐	Not Applicable	
IS THE PANEL IP RATING SUITABLE FOR THE ENVIRONMENT-	☑	Passed	☐	Not Applicable	
TERMINALS TOP OR BOTTOM -	☑	Top	☐	Bottom	
TERMINAL MARKINGS -	☑	Passed	☐	Not Applicable	
TERMINAL SEPARATOR PLATES FITTED IN CORRECT POSITION -	☑	Passed	☐	Not Applicable	
GLAND HOLES -	☐	Inserted	☑	Blank	
MAIN ISOLATOR POSITIONING -	☐	Passed	☑	Not Applicable	
MAIN ISOLATOR SIZE -	☐	Passed	☑	Not Applicable	
MAIN ISOLATOR DOOR INTERLOCK -	☐	Passed	☑	Not Applicable	
EXTERNAL LABEL POSITIONS -	☑	Passed	☐	Not Applicable	
EXTERNAL LABEL SPELLING -	☑	Passed	☐	Not Applicable	
EXTERNAL DANGER LABELS -	☑	Passed	☐	Not Applicable	
INTERNAL LABEL POSITIONS -	☑	Passed	☐	Not Applicable	
INTERNAL LABEL SPELLING -	☑	Passed	☐	Not Applicable	
INTERNAL DANGER LABELS -	☑	Passed	☐	Not Applicable	
INCOMING SUPPLY TERMINATION'S -	☑	Passed	☐	Not Applicable	
INCOMING EARTH TERMINATION -	☑	Passed	☐	Not Applicable	
GLAND PLATE & DOOR EARTHING -	☑	Passed	☐	Not Applicable	
SEGREGATION OF SUPPLIES -	☐	Passed	☑	Not Applicable	
TRUNKING SPACE FACTORS (MIN 25% FREE) -	☑	Passed	☐	Not Applicable	
POWER CONNECTIONS TORQUE TESTED & MARKED UP -	☑	Passed	☐	Not Applicable	

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

MOTOR STARTER SIZING -	☐ Passed	☑ Not Applicable	
MOTOR OVERLOAD SIZING -	☐ Passed	☑ Not Applicable	
MOTOR OVERLOAD SETTINGS -	☐ Passed	☑ Not Applicable	
CONTACTOR kW RATINGS -	☐ Passed	☑ Not Applicable	
MCB SIZING -	☑ Passed	☐ Not Applicable	
INVERTER SIZING -	☐ Passed	☑ Not Applicable	
SOFT-START SIZING -	☐ Passed	☑ Not Applicable	
CORRECT AIR GAP BETWEEN INVERTERS -	☐ Passed	☑ Not Applicable	
4 POLE RELAYS CHECKED FOR CORRECT COIL VOLTAGES -	☐ Passed	☑ Not Applicable	
SRM's CHECKED FOR CORRECT COIL VOLTAGES -	☐ Passed	☑ Not Applicable	
METALWORK EARTHED TO MAIN EARTH TERMINATION -	☑ Passed		
PANEL THERMOSTAT(S) SET -	☐ Passed	☑ Not Applicable	
L.E.D LENS COLOURS CHECKED -	☐ Passed	☑ Not Applicable	
GENERAL WIRE TIGHTNESS -	☑ Passed		
FREE LOOMING NEATNESS -	☑ Passed	☐ Not Applicable	
DOOR WIRING NEATNESS -	☑ Passed	☐ Not Applicable	
GENERAL ENCLOSURE NEATNESS -	☑ Passed		
PANEL CLEANED & HOVERED -	☑ Passed	☐ Not Applicable	

I/O Modules Settings	Inspection Result		Notes
CONTROLLER ADDRESSES CORRECT -	☐ Passed	☑ Not Applicable	
I/O MODULE ADDRESSES CORRECT -	☐ Passed	☑ Not Applicable	
DIX MODULE JUMPERS REMOVED FOR AUTO OPERATION -	☐ Passed	☑ Not Applicable	
RELAY OUTPUT MODULE JUMPERS SET (R/L OR H/L) -	☐ Passed	☑ Not Applicable	

Panel Photographs		Notes
INTERNAL -	☑ Yes	
EXTERNAL -	☑ Yes	
ARE THEY LEGIBLE -	☑ Yes	

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

Functionality Tests With Voltage Applied	Inspection Result		Notes
MAIN ISOLATOR -	☐ Passed	☑ Not Applicable	
MCB SUPPLIES -	☑ Passed	☐ Not Applicable	
PHASE FAILURE RELAY OPERATED -	☐ Passed	☑ Not Applicable	
MAINS TRANSFORMERS -	☑ Passed	☑ Not Applicable	
MAIN CONTROL CIRCUITS -	☑ Passed	☑ Not Applicable	
CONTROL TRANSFORMERS -	☑ Passed	☐ Not Applicable	
SUB CONTROL CIRCUITS -	☑ Passed	☐ Not Applicable	
FIRE ALARM INTERLOCK CIRCUIT -	☐ Passed	☑ Not Applicable	
FIREMANS SWITCH AUTO / OFF / EXTRACT -	☐ Passed	☑ Not Applicable	
GAS VALVE SAFETY CIRCUIT -	☐ Passed	☑ Not Applicable	
GAS DETECTION UNIT -	☐ Passed	☑ Not Applicable	
PRESSURISATION INTERLOCK CIRCUIT -	☐ Passed	☑ Not Applicable	
EXTERNAL INTERLOCK CIRCUITS -	☐ Passed	☑ Not Applicable	
MOTOR STARTERS OPERATION -	☐ Passed	☑ Not Applicable	
SOFT STARTERS OPERATION -	☐ Passed	☑ Not Applicable	
VOLTAGE CHECKED AT TERMINALS FOR SWITCHED SUPPLIES -	☐ Passed	☑ Not Applicable	
INVERTERS PROGRAMMED & OPERATED -	☐ Passed	☑ Not Applicable	
INVERTER INTERLOCKS -	☐ Passed	☑ Not Applicable	
TIMERS SET TO DOE / DODE ETC -	☐ Passed	☑ Not Applicable	
TIMERS RUN TIME SET -	☐ Passed	☑ Not Applicable	
PLANT ITEMS OPERATE IN AUTO MODE -	☐ Passed	☑ Not Applicable	
LAMP TEST OPERATION -	☐ Passed	☑ Not Applicable	
UPS OPERATED IN MAINS & BACK-UP MODE -	☐ Passed	☑ Not Applicable	
PANEL VENTILATION FANS DIRECTION -	☐ Passed	☑ Not Applicable	
BMS CONTROLLERS POWERED UP -	☐ Passed	☑ Not Applicable	
BMS INTER-CONTROLLER NETWORK -	☐ Passed	☑ Not Applicable	
SOFTWARE DOWNLOADED TO CONTROLLER(S) -	☐ Passed	☑ Not Applicable	

Form: MPF 5.6 Operations

Issue C

PANEL TEST RECORD

Project No -	4606
Panel Ref -	FMCP

Insulation Tests @ 1kV	Readings	Unit
INSULATION BROWN TO EARTH -	>999	MΩ
INSULATION BLACK TO EARTH -		MΩ
INSULATION GRAY TO EARTH -		MΩ
INSULATION BLUE TO EARTH -	>999	MΩ
INSULATION BROWN TO BLUE -	>999	MΩ
INSULATION BLACK TO BLUE -		MΩ
INSULATION GRAY TO BLUE -		MΩ
INSULATION BROWN TO BLACK -		MΩ
INSULATION BROWN TO GRAY -		MΩ
INSULATION BLACK TO GRAY -		MΩ

Flash Tests For 1 Minute @	Readings	Unit
LEAKAGE BROWN TO EARTH -	NA	MΩ
LEAKAGE BLACK TO EARTH -	- -	MΩ
LEAKAGE GRAY TO EARTH -	- -	MΩ
LEAKAGE BLUE TO EARTH -	- -	MΩ
LEAKAGE BROWN TO BLUE -	- -	MΩ
LEAKAGE BLACK TO BLUE -	- -	MΩ
LEAKAGE GRAY TO BLUE -	- -	MΩ
LEAKAGE BROWN TO BLACK -	- -	MΩ
LEAKAGE BROWN TO GRAY -	- -	MΩ
LEAKAGE BLACK TO GRAY -	- -	MΩ

Controller Series Description	Controller Serial Number

Form: MPF 5.6 Operations

Issue C

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

Items Listed Below Are Not fitted at the Time of Despatch and Will Be Reported to the Project Engineer	
Quantity	Item
X1	SynaPSis SIP +
X1	MB48 SLICE

Place Holder

Declaration of Conformity

The Manufacturer of the Products covered by this Declaration is:

IBMS Ltd
Brunel Drive,
Newark,
NG24 2DE

The Directives covered by this Declaration:

2014/30/EU, Low Voltage Directive (LVD)
2014/30/EU, Electromagnetic Compatibility Directive (EMC)

The Products Covered by this Declaration

Product Name:	*EMCP/CALDER PARK WAKEFIELD*
Panel ref no:	*4606/ENERGY MONITORING CONTROL PANEL*

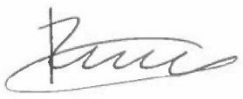
The Basis on which Conformity is being Declared

The manufacturer hereby declares under his sole responsibility that the products identified above comply with the protection requirements of the EMC directive and with the principal elements of the safety objectives of the Low Voltage Equipment directive, and that the following harmonised standards have been applied:

Standard ref	Title
BS EN 61439-1	*Low-voltage switchgear and control gear assemblies. General rules*
BS EN 61439-2	*Low-voltage switchgear and control gear assemblies. Power switchgear and control gear assemblies*

The technical documentation required to demonstrate that the products meet the requirements of the Low Voltage Equipment directive has been compiled and is available for inspection by the relevant enforcement authorities.

The CE mark was first applied in:

Signed: 

Authority: Project Manager

Date: 12/07/2022

CE

Attention!

The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives.

Details of these special measures and limitations to use are available on request,
and are also contained in the product manuals.

Components used in the assembly of the product are CE marked by the manufacturer's, details of which are available on request.

Cleaning and Maintenance Regimes

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Cleaning and Maintenance Regimes

This maintenance schedule for P21-024 Calder Park to be followed from PC date (30/08/2022) year on year to ensure all plant and equipment is kept within warranty.

Please keep a log of these inspections so that records can be checked should an issue arise.

Code; ✓ **Blue – Recommended** ✓ **Red – To Maintain Warranty**

Item	Daily	Weekly	Monthly	3 Months	6 Months	9 Months	Annually	5 Yearly	Certificates	Regime
Control Panels	✓	✓		✓	✓					Check panel door is tightly closed. Check panel is live, all selections are correct, correct indication lamps are showing and no alarms are present. Clean panel facia and check all lamps are serviceable. Replace any defective lamp. Check setting of time switch. Isolate panel and check all fuses are correctly rated and overload settings are correct. Clean and check operation of all relays, contactors, and overloads. Check air seal round door. Any relays or contactors found to be excessively noisy, or chattering should be demounted, and blow cleaned. Check all connections are secure and no signs of overheating or arcing are present. Check that protective shrouds are in position over incomer and remotely fed terminals. Change time switch setting by one hour to BST/GMT (if applicable).

Compliance with this document does not ensure or imply compliance with current health and safety legislation. It is the responsibility of the premises controller at all times to ensure compliance with latest health and safety legislation.

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Item	Daily	Weekly	Monthly	3 Months	6 Months	9 Months	Annually	5 Yearly	Certificates	Regime
Drainage Systems		✓		✓			✓			Check floor gullies, rainwater gutters, channels and inlets for build-up of foreign material, clean as necessary. It is advisable to flush out water seals every month to avoid stagnant water. Check roof vent pipes are clear of obstructions and wire balloons kept firmly in position. Check all rodding covers for leaks. Inspect sumps for build-up of foreign matter. Inspect sump pump for satisfactory operation in accordance with manufacturer's recommendations. Level regulators should be inspected to ensure sump pump automatically starts and stops to meet the demand of water flow. Inspect and rod stacks to which urinals and WC's are connected. Check all systems for correct drainage making good any defects. Rod and flush out with clean water all main drainage runs. Remove manhole covers and inspect main drainage inspection pits for build-up of foreign matter and structural damage.
Ductwork (Including Smoke/Fire Dampers)			✓		✓		✓			Check all duct joints and access panels are airtight. Reseal as necessary. Check all test hole plugs are in place. Check all regulating dampers are locked in regulated positions. Operate dampers through total range of travel to check for freedom of movement. Where restrictions are found re-adjust or lubricate linkage as necessary. Return dampers to correct regulated positions. Clean damper blades and lubricate pivots linkage, checking for wear. Check all ductwork supports are tight and free of corrosion. Inspect ductwork for damage to finishes and corrosion. Treat and repair as necessary. Check the internal condition and cleanliness of the ductwork and clean where necessary. Additional guidance should be sought from HVCA TR/19 "Internal Cleanliness of Ventilation Systems"

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Item	Daily	Weekly	Monthly	3 Months	6 Months	9 Months	Annually	5 Yearly	Certificates	Regime
External Louvres			✓		✓		✓			Clean slats and mesh screen. Remove any debris found. Use a mild non-abrasive detergent. Ensure that all acoustic insulating material is properly retained. Inspect for damage to finishes and corrosion.
Fans (Direct Drive)	✓	✓	✓		✓					Check fan is running smoothly without excessive noise or vibration. Check flexible connections are secure, taut and airtight. Connections must not restrict air flow. Check anti-vibration mountings/hangers are secure, free to move and in good condition. Clean impeller and blades. Check security of impeller on shaft and inspect blades for security and damage. Check performance of fan (shaft speed, air velocity and pressure). Clean and check casing externally, repairing any corrosion or damage to finish found. Check all bolted joints are secure.
Grilles & Diffusers		✓	✓		✓					Check that grilles and diffusers are clean and not smutting surrounding surface. (External louvres) Clean slats and mesh screen. Remove any debris found. Measure air volume at each grille and compare with commissioning values. Check air diffusion pattern. Adjust if necessary. Any readjustment to air volumes should be carried out by specialists.
Insulation			✓							Check that all insulation is securely in place, including valve and flange boxes. Inspect insulation for staining. Possible sign of water leakage. Inspect vapour seals. Repair any breaks in seal found. Ensure that insulation is dry before carrying out repair. Check identity bands are in place and visible.

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Item	Daily	Weekly	Monthly	3 Months	6 Months	9 Months	Annually	5 Yearly	Certificates	Regime
Pipework (Including Fittings)	✓	✓	✓		✓		✓			Check all pressures and temperatures are satisfactory. Check all valves and cocks for gland leakage. Tighten or repack as necessary. Check non-return valves for positive shut-off. Clean out filters, strainers and dirt pockets. Release all air collected in air vents. Check odour of air for corrosion. Test all pipework connections for leaks. Tighten or remake as necessary Caution must be taken on any high temperature systems. Check alignment of expansion bellows and loops. Check anchor points are secure. Check guide points for wear and freedom of pipe movement. Apply a coating of grease round guide/roller as necessary. Operate all valves and cocks through their total range of travel leaving at correct regulated setting. Ensure valve positively shuts off. Check water for dissolved solids and pH value and chemically dose as required. Check all pipe supports, hangers and flange bolts for security. Tighten as necessary. No plant should be taking the weight of pipework. Check all pipework, supports, hangers, etc. for corrosion. Treat and repair as necessary. Check and maintain associated items listed below.

Compliance with this document does not ensure or imply compliance with current health and safety legislation. It is the responsibility of the premises controller at all times to ensure compliance with latest health and safety legislation.

Item	Daily	Weekly	Monthly	3 Months	6 Months	9 Months	Annually	5 Yearly	Certificates	Regime
Sanitaryware & Fittings		✓								Check draw-off taps for leakage. If tap drops whilst fully shut renew the washer. If water escapes from the valve stem whilst the tap is fully open tighten gland. Check spray taps for satisfactory spray. Where necessary remove spray orifice and clean, remove any accumulation of scale. Check stop cock valve stems for leakage, tighten gland or replace as necessary. Check basins and sink overflows are not blocked by inserting plug and leaving cold tap running, the overflow aperture should be adequate to ensure no overflowing occurs. If overflowing occurs inspect overflow aperture and waterways for partial blockage, if they are clear a blockage at the basin/sink trap may be suspected. Check urinals for satisfactory drainage, remove any articles which may be blocking the discharge grating. Check WC pans are full of water and correct drainage occurs. Check bank connections for leakage. Inspect wwp and auto flushing cisterns for leaks, correct operation of float valve and satisfactory water level. Generally check all sanitary fittings for cleanliness, cracks, security and satisfactory operation and drainage. Regularly inspect overflows and working pipes for water. Inspect all traps for partial blockage. Traps fitted where excessive build-up of grease or dirt is likely to occur should be stripped down and flushed with hot water.
Valves (General)		✓		✓						Check unit generally for leaks, corrosion or damage and ensure all valves are cleaned externally. Valve glands should be regularly checked for leakage. Gland nuts should be tightened as necessary, just sufficiently to prevent leakage whilst leaving the valve spindle free to move easily. Check operation of valve. Valves must be operated to ensure they are free to operate and minimise any tendency towards sticking. Change discs, gland packing and bonnet gaskets.

Compliance with this document does not ensure or imply compliance with current health and safety legislation. It is the responsibility of the premises controller at all times to ensure compliance with latest health and safety legislation.

Data Sheets

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INTEGRATED BUILDING MANAGEMENT SYSTEMS LTD.
Brunel Drive, Newark, Notts. NG24 2DE.
Telephone: 01636 674875
Web: www.integratedbms.co.uk Email: controls@integratedbms.co.uk

Description of Operation for the Building Management System at

Calder Park, Wakefield

Date: 13/04/2022
Prepared by: RH
iBMS Reference: 4606 DesOps Rev A

Contents

1 Revision History

Revision	Date	Change Summary	By
A	13/04/22	Initial Issue	RH

2 BMS Overview

2.1 Control Panels

A **B**uilding **M**anagement **S**ystem (**BMS**), consisting of Synapsys energy management interface devices monitor the relevant metering systems associated with Calder Park, Wakefield.

The name and location of the control panel is as follows:

1. EMCP – Adjacent to LV Switchboard in warehouse.

3 Time Zone Overview & Plant Operation

3.1 Time Zones

The energy management interface operates to monitor the associated metering systems on a 24/7 basis.

4 Operational Descriptions

4.1 Metering

The energy management interface monitors & logs the following utility meters:

4.1.1 Electric Meters (ModBus kWh)

Main LV Panel – LV01
- Incoming LV Meter – ELM01
- Ext DB/5 Feed LV Meter – ELM02
- Mechanical DB Feed LV Meter – ELM03
- Door & Dock Leveller BB1 Feed LV Meter – ELM04
- Door & Dock Leveller BB2 Feed LV Meter – ELM05
- Lift Feed LV Meter – ELM06
- Gatehouse L&P DB/GH Feed LV Meter – ELM07

External Lighting & Power Distribution Board – DB5
- Lighting LV Meter – ELM08
- Power LV Meter – ELM09

Warehouse Lighting & Power Distribution Board – DB6
- Lighting LV Meter – ELM10
- Power LV Meter – ELM11

Dock Tower Office Lighting & Power Distribution Board – DB7
- Lighting LV Meter – ELM12
- Power LV Meter – ELM13

Level 00 Office Lighting & Power Distribution Board – DB1
- Lighting LV Meter – ELM14
- Power LV Meter – ELM15

Level 01 Office Lighting & Power Distribution Board – DB2
- Lighting LV Meter – ELM16
- Power LV Meter – ELM17

Level 02 Office Lighting & Power Distribution Board – DB3

- Lighting LV Meter – ELM18
- Power LV Meter – ELM19

Readings are taken every 12 hours and plotted with daily, weekly and monthly cumulative totals also available for interrogation by the end user on the supervisor display panel.

4.1.2 Water Meters (MBus m^3)

- Boundary Water Meter (monitored via PadPuls interface) – WM01

Readings are taken every 12 hours and plotted with daily, weekly and monthly cumulative totals also available for interrogation by the end user on the supervisor display panel.

5 BMS Supervisor

The supervisor display panel is located on the front of the BMS control panel EMCP and utilises an easy to operate dashboard-based interface that requires the user to navigate to the desired location or item to interrogate for further information.

Navigation is integrated into the system to enable the user to move around the system with ease.

Information can be viewed, adjusted and monitored if the operator has the required level of access and credentials.

Plots or traces can be produced and saved or exported by the end user on request.

6 Control Panel Construction

6.1 Drawings

Control panel external layout and wiring drawings are produced using Microsoft Visio on A4 sized paper.
All control panel equipment is labelled with a dedicated reference.
All wire and terminal numbers are shown.

The control panel drawings are issued with drawing numbers that reference to the contract.

A full set of 'as manufactured' drawings are provided with the panel, housed in an internal drawing pocket.

6.2 Safety

Panels are constructed with components that meet IP20 standards to allow safe live testing with the door open.

All control circuits are 24VAC.

All phases, including incoming isolator terminals, are fully shrouded.

Terminals having live feeds from external equipment are shrouded and carry a warning label.

6.3 Enclosure

The control panel enclosure is designed to meet IP54 Protection Standards.

The control panel is manufactured to Form 1 type construction.
Each individual starter is covered by transparent plastic and fitted with an interlockable isolator.

Panel body and doors are of sufficient thickness (1.5 - 2.0mm) and braced to form a rigid structure.
Doors are braced as necessary to prevent flexing.
The equipment mounting plates are 2.5mm galvanised sheet steel and equipment mounting is by screws into tapped holes to enable replacements to be made from the front only.

Wall mounting panels do not exceed 1200mm in height.
Panels exceeding 1200mm in height are of the floor standing type.

Floor standing panels are manufactured and delivered to site as a single item.
Panels can be split into sections if required for site access at an additional cost.

Floor standing panels have provision for lifting eyes and for fixing to a concrete plinth.

All panel doors are lockable in the closed position and all locks use the same key.

The controls section door is not interlocked unless specified.

Natural or forced ventilation is provided to prevent the internal temperature exceeding a maximum of 40°C, if required.

6.4 Finishes and Labelling

Panels are finished in standard RAL7035 Grey.

Internal mounting plates are galvanised steel.

Panel fascia labels for plant control and indication are white traffolyte with black lettering.
Standard sizes for labels are 110mm wide by 140mm high or 220mm wide by 140mm high and cover the entire area taken up by the relevant equipment (e.g., switches and associated lamps).
All fascia labels are fixed with bright finish pan head screws.

Warning labels are yellow self-adhesive type with black lettering.

Internal labels are clear self-adhesive type with black lettering fitted to the grey trunking lids & white self-adhesive with black lettering fitted to panel components.

6.5 Wiring, Identification and Labelling

All internal panel wiring is in accordance with IET wiring regulations.

Power wiring is tri-rated (stranded) in phase colours with a minimum size of 2.5mm² up to and including 6.0mm².

Power wiring 10.0mm² and above is black cables with terminal sleeves in phase colours.
Control circuit wiring is kept physically separated from other circuits within the panel and is tri-rated cable (stranded), with a minimum size of 1.0mm².

The cable colour coding is as follows:

400VAC	Brown/Black/Grey/Blue
230VAC	Brown/Blue
24VAC	Red/Orange
12/24VDC	Violet
Controls cables (ELV)	White

Analogue signal cable has an overall screen of either braiding or foil and with PVC sheath.
Foil-screened cables contain a ‘drain wire’, running the entire length of the cable, which is used for terminating the screen.
Conductors are of the flexible (stranded) type and are individually sheathed in PVC.

Wiring is carried on the front surface of the mounting plate neatly strapped in suitably sized ventilated plastic cable trunking.

Cable and trunking sizes complies with the IET Wiring Regulations with regards to grouping, bunching and enclosing factors.

Wiring to movable doors is loomed and protected with spiral wrap.

Wiring outside the trunking or loom is neatly set for connection to terminals or equipment.

All control wires carry numbered ferrules at both ends.

Each incoming and outgoing cable is separately terminated with an approved crimped terminal to suit the terminal use.

Terminals for control wiring is of the IDC to screw type and sized depending on rating.

Terminals for power wiring is of the IDC to screw type and sized depending on rating.

Terminals for differing voltages and circuit types are segregated and labelled accordingly.

No more than two wires are connected to any one terminal.

Insulating barriers are fixed between adjacent terminals for power wiring to give adequate protection while allowing easy access to terminals.

6.6 Cable Entries

Removable gland plates are provided for terminating incoming cabling.
All plates are sealed against the ingress of dirt, dust and moister.

All entries for cables is easily accessible and marked to correspond with the panel-wiring diagram of external connections.

6.7 Controls Section

The controls section houses the DDC controllers and any power supplies, interface relays and terminals as detailed on the drawings.

An internal shrouded on/off switch is provided to allow isolation of the controls section.

The power supply to the controls section is taken from the live side of the main incoming isolator.

Controller input cables are screened, and a terminal is provided for each cables screen.
The cable from the incoming terminals to the controller is continue screened with the screens grounded to clean earth bars adjacent to the controllers

A 13A socket is provided within the controls section for supplying test equipment.
The socket is labelled “For computer use only”.

6.8 Panel Equipment

6.8.1 Isolators

Main isolating switches and fuse switches are capable of opening and closing on-load and are suitable for 50Hz three phase, four wire operation.

6.8.2 Miniature Circuit Breakers

All protective devices are Miniature Circuit Breakers.

MCBs are selected in accordance with manufacturers’ recommendations to suit the application.

The circuit breaker mechanism is of the current limiting type to ensure interruption of a fault current during the ‘rise’ of the first half cycle, thus limiting the let-through energy.

The operating mechanism is completely trip-free, and it is not possible to prevent the breaker tripping by holding or wedging the handle in the ‘ON’ position.

6.8.3 Contactors

Contactors are suitable for use on three phase, four wire 400/230V, 50Hz supplies and fitted with 24VAC coils, unless otherwise detailed.

6.8.4 Motor Overload Protection

Motor protection is provided by breakers with combined magnetic (short circuit) and thermal overload releases.
Also, protection against phase loss is provided by a differential trip.
The device is suitable for providing isolation and will accept a padlock.

Motor protection devices above 37.5kw are of the electronic type.

All motor protection devices are arranged for hand resetting.

6.8.5 Interlocking Relays

Plug-in type relays are interchangeable with equal numbers of 'N/O' and 'N/C' contacts.
Relays operating on different control voltages are grouped and labelled with coil voltage.

All relays have an integral status indication and manual override.

6.8.6 Switches

Control switches are of the rotary type, comprising a switch handle fixed to the panel fascia and the required number of contacts fitted to the rear of the bezel.

Control switches have black handles unless specified as key-operated and have a protection index of IP54.

6.8.7 Indicator Lamps

Indicator lamps are multi-cluster LED type and generally operate on 24vAC.
230vAC lamps are only be used for mains supply status indication.

Colours of lamp lenses are as detailed in BS EN 69973:

Green	-	Motor running
Red	-	Motor tripped, alarm
White	-	Power On, control circuit live
Amber	-	Flow fail, filter dirty
Blue	-	Frost active

The control panel is supplied with a lamp test push button.

6.9 Inspection & Testing

All control panels undergo a final inspection and test procedure.

Each control panel has its own unique control panel test certificate and serial number.

6.10 Despatch

Control panels are despatched with a set of 'as manufactured' drawings.

Control panels are despatched with a copy of the test certificate.

7 Appendix A - Plant Schematics

The relevant control panel schematics are appended to this document:

See Revision * attached.

Integrated Building Management Systems Ltd

Telephone: 01636 674 875
E-mail: controls@integratedbms.co.uk
Web: www.integratedbms.co.uk

Calder Park, Wakefield

Energy Monitoring Control Panel

4606/EMCP

HEAD OFFICE

Integrated Building Management Systems Ltd,
Brunel Drive,
Newark,
Notts,
NG24 2DE.

Tel: 01636 674 875
Fax: 01636 612 228
E-mail: controls@integratedbms.co.uk

IBMS Project Engineer

IBMS Engineer

PANEL DETAILS

Height (mm):	500 mm
Width (mm):	500 mm
Depth (mm):	210 mm
Approx Weight (kg):	20 kg
Mounting:	Wall Mounted
Eye Bolts Required:	N/A
Terminal Position:	Top
Isolator Position:	N/A - Switched Fused Spur
Panel Split Required:	N/A

SPECIAL INSTRUCTIONS

CLIENT

Carter Electrical Services Ltd,
Unit 6 North Staffs Business Park,
Innovation Way,
Stoke on Trent,
Staffordshire,
ST6 4BF.
Tel: 07875 931300,
Fax: ,
E-mail: ,

Clients Project Engineer

Simon Robinson

SITE ADDRESS

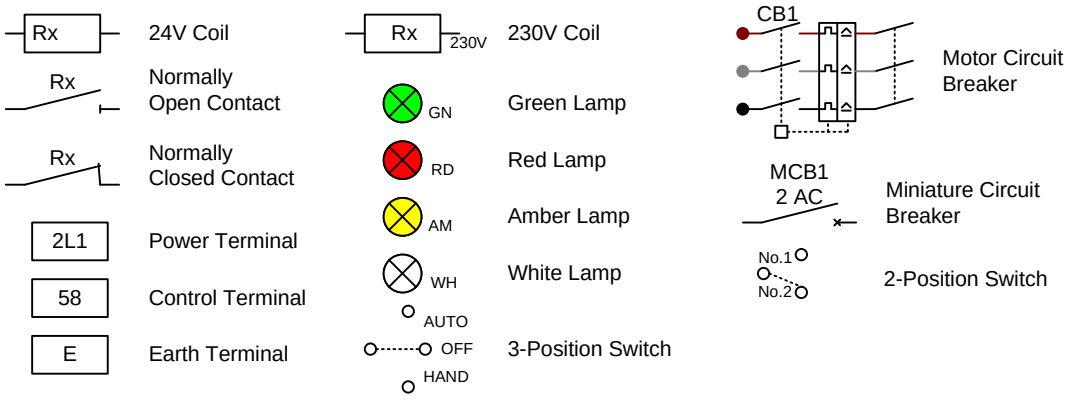
Calder Park,
Peel Avenue,
Wakefield,
WF2 7UA,
,
.
Tel: ,
Fax: ,
E-mail: ,

NOTES

These drawings are only a guide. Electrical installation works to be carried out to BS7671 and any other relevant specification / authority requirements.
Electrical contractor to identify each cable with numbers as detailed on wiring diagrams.

IF IN DOUBT - ASK

Symbol Key



Panel Information

400VAC L1:	Brown
400VAC L2:	Black
400VAC L3:	Grey
400VAC Neutral:	Blue
230VAC Live:	Brown
230VAC Neutral:	Blue
24VAC Live:	Red
24VAC Neutral:	Orange
24VDC +/-:	Purple

MCB Types:
Standard rated: Type ‘C’
Motor rated: Type ‘D’

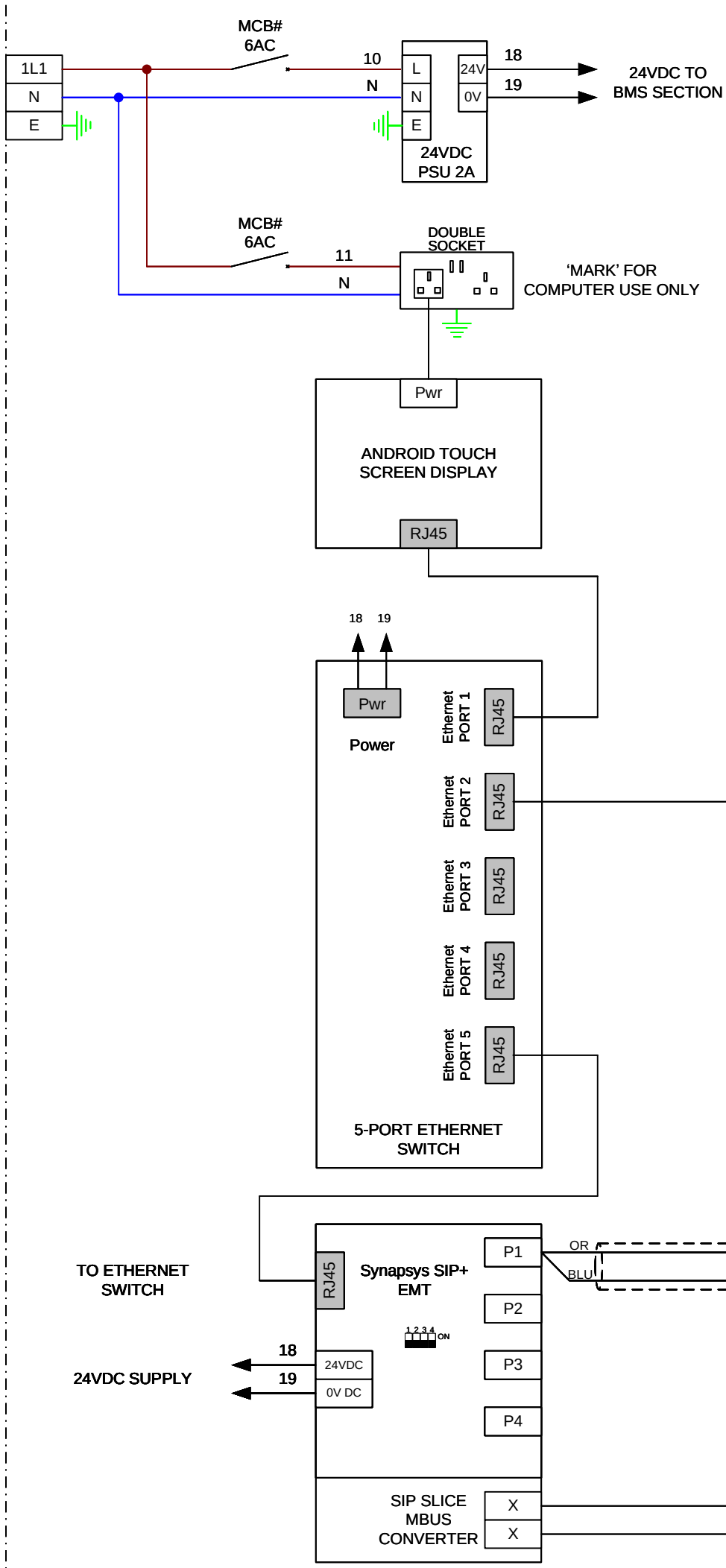
Cables Sizes:
Power: Minimum 2.5mm tri-rated
Control: Minimum 1mm tri-rated

DRAWING REVISION & HISTORY

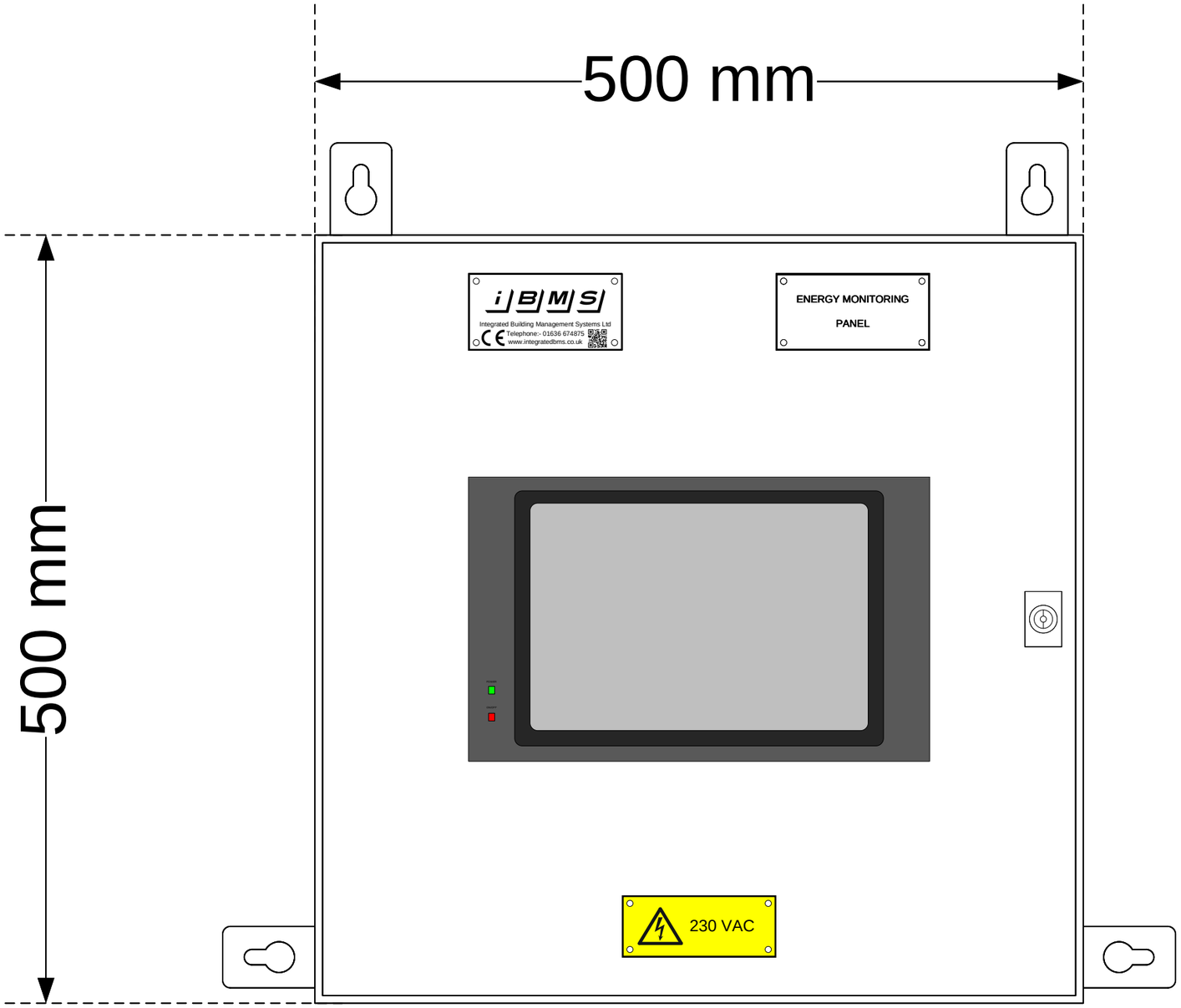
Rev	Date	Status	Change	Drn	Chk
A	08/04/22	For Approval	First drawing issue	DM	GS/ RH
B	14/04/22	As Manufactured	Updated from workshop	BB	GS/ RH
C					
D					
E					
F					
G					

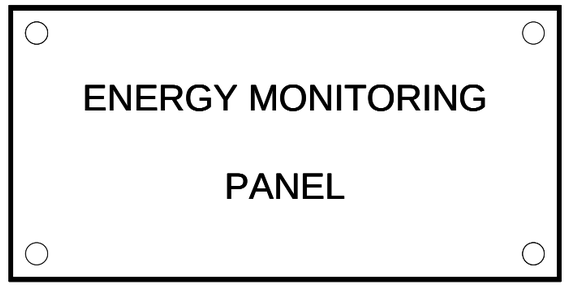
Rev	Date	Status	Change	Drn	Chk
H					
I					
J					
K					
L					
M					
X					

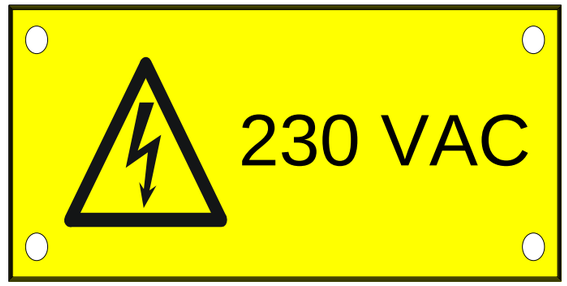
230VAC SUPPLY FROM LOCAL
13A SWITCHED FUSED SPUR



iBMS	Project:	Calder Park, Wakefield	Ref: 4606/EMCP	
	Title:	Energy Monitoring Control Panel	Date: 14/04/2022	Drawn: BB
	Client:	Carter Electrical Services Ltd	Sht 2 of 3	Rev: B







	Title:	Energy Monitoring Control Panel	Ref: 4606/EMCP	
	Project:	Calder Park, Wakefield	Date: 14/04/2022	Drawn: BB
	Client:	Carter Electrical Services Ltd	Sht 3 of 3	Rev: B

SYNAPSYS
BUILDING INTELLIGENCE

SIPslice M-Bus Converter

Overview

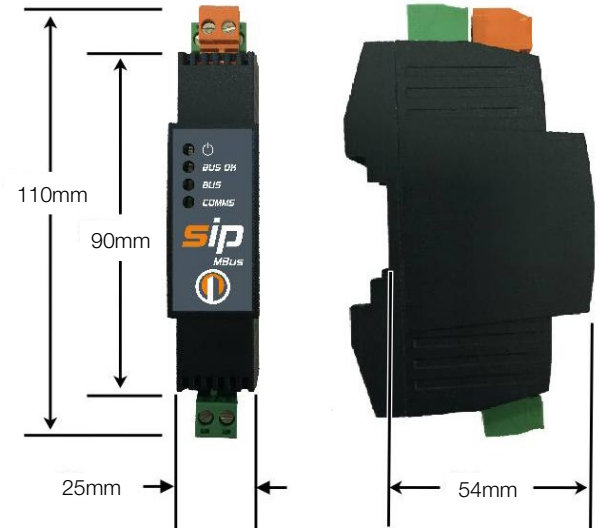
The Synapsys SIPslice M-Bus Level Converter has been developed to provide a simple and efficient way of interfacing third party M-Bus meters such as Heat, Gas, Water, Electricity or Pulse counters to an M-Bus master, for example our own SIPe M-Bus M-Logger, SIP M-Bus Trend interface, Trend XNC or other integration technologies.

Designed for receiving and transmitting data from multiple 1.5mA meter loads utilising the M-Bus protocol, the SIP M-Bus Level Converter is also resistant to sustained short circuit and is available for a wide power supply range.

SIPslice M-Bus converters have a small footprint with variants ranging from 3 to 250 slave devices, supporting M-Bus communications via both RS232 and RS485.

SIPslice M-Bus Level Converter features

- Available in 3, 20, 60, 120 or 250 unit load variants
- Small footprint
- LED's for power, Bus activity, Health and Comms
- Transmission rate 300 to 9600 Baud
- 1 x RS232 connection
- 1 x RS485 connection
- 1 x M-Bus protocol (M+ and M-)
- DIN rail mounting



At a glance

- Cost effective M-Bus level converter solution
- Simple to use and install
- Small footprint
- Available in 3 to 250 unit load variants
- Backed up by Synapsys technical support

Ordering

Synapsys offer a range of SIP slice products and to make it easier for you to select the correct product for your application we have created two sets of product codes for the SIP M-Bus slice products:

- One set of codes for connection to our SIP and any other third party master device
- Second set of codes for connection to our brand new SIP+ device

Just ensure you order the correct SIP slice for your application and the connectors you require will come free of charge.

SYNAPSYS
BUILDING INTELLIGENCE

Product codes

SIP Slice M-Bus products connecting to SIP or third party device

When connecting a SIP Slice M-Bus product to a SIP or a third party master device please ensure you order using the codes below.

Your SIP M-Bus slice will come with the following to enable connection:

- Power connector
- RS485 connector
- RS232 cable

Part No.	Description
SYN/MBUS/CONV/3	SIPslice M-Bus level converter for up to 3 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/20	SIPslice M-Bus level converter for up to 20 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/60	SIPslice M-Bus level converter for up to 60 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/120	SIPslice M-Bus level converter for up to 120 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/250	SIPslice M-Bus level converter for up to 250 unit loads to be used with a SIP or a third party master device.

SIP Slice M-Bus products connecting to SIP+ devices

When connecting a SIP Slice M-Bus product to a SIP+ device please ensure you order using the codes below.

Your SIP M-Bus slice will come with the following to enable connection:

- DIN rail connector for communications and power via the CAN Bus from a SIP+ device

Part No.	Description
SYN+/MBUS/CONV/3	SIPslice M-Bus level converter for up to 3 unit loads to be used with a SIP+
SYN+/MBUS/CONV/20	SIPslice M-Bus level converter for up to 20 unit loads to be used with a SIP+
SYN+/MBUS/CONV/60	SIPslice M-Bus level converter for up to 60 unit loads to be used with a SIP+
SYN+/MBUS/CONV/120	SIPslice M-Bus level converter for up to 120 unit loads to be used with a SIP+
SYN+/MBUS/CONV/250	SIPslice M-Bus level converter for up to 250 unit loads to be used with a SIP+

For more information about Synapsys and our product range please visit www.synapsys-solutions.com.

Alternatively to speak with one of our team in more detail or to arrange a demonstration of our products and solutions, please contact us on 01444 246 128 and we will be happy to discuss your requirements.

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SYNAPSYS
BUILDING INTELLIGENCE

Vorex 10”/15” BMS Touch Display Unit, Panel Mount Manual

Environmental Considerations:

1.Operating Environment

Ambient temperature:-10℃-60℃

Ambient humidity: 40%-65%

Transport/storage temperature:-20℃-60℃

Transport/storage humidity: 35%-80%

2. Power Specifications

Rated voltage: AC100V-240V switch to DC12V

Rated frequency: 50Hz-60Hz

Rated current:3/5A

Do not place the PC on an unstable place.

Avoid all in one PC to heat sources.

Working power is AC 100V-240V switch to DC12V.

Avoid contact or expose to inappropriate temperatures, solvents, acid, water or moisture.

Avoid the fragmentation, corrosion and any other damage to products or components (Such As Shell, LCD/LED panel, port, circuits etc.)

Screen protection is supplied please leave this is place until the project is handed over, the screen will still operate touch trough the screen saver.

10.1” All Metal Android BMS Touch Screen

Size	**10.1" Android touch screen Panel PC**
Panel Type	Industrial LCD panel A+ grade
Aspect Ratio	16:9
Resolution	1366*768
Contrast	800:1
Luminance	**300nit**
Response time	5ms
Active Area (mm)	227(W)*131(H)
Display colours	16.7M(8-bit)
Configuration -CPU	**A83T SOC Octa-core ARM Cortex-A7 2.0Ghz**
	8G EMMC
Built in	**Wi-Fi/Bluetooth**
OS	**Android 4.4 may vary**
Touch type	**Capacitive touch-10 points**
I/O Ports	1*12V Power Adapter ,2*USB,1*SD card slot,1*HDMI
	1*RJ-45 network interface
	1*Audio I/O interface
	1*COM IO May vary
Language	Chinese, English, French, German, Italian, Japanese, Korean, Russian, Spanish etc.
Certificate of Approval	CE, FCC, RoHS, ISO
Installation	**VESA(100x100)without stand**/Embedded/Wall Mount/ Desktop
Colour	Black
Material	Aluminium Alloy
Addition*	**External sleep and wake button**

*Some 10.1” screens are fitted with an external sleep/wake button this can be mounted external on the panel door, only use the top mount USB socket, it is marked with a red edged label

15” All Metal Android BMS Touch Screen

Size	**15" Android touch screen Panel PC**
Panel Type	Industrial LCD panel A+ grade
Aspect Ratio	4:3
Resolution	1024*768
Contrast	1000:1
Luminance	**350nit**
Response time	5ms
Active Area (mm)	304.1(W)*228.1(H)
Display colours	16.7M(8-bit)
Configuration -CPU	**A83T SOC Octa-core ARM Cortex-A7 2.0Ghz**
	8G EMMC
Built in	**Wi-Fi/Bluetooth**
OS	**Android 4.4 may vary**
Touch type	**Capacitive touch-10 points**
I/O Ports	1*12V Power Adapter ,2*USB,1*SD card slot,1*HDMI
	1*RJ-45 network interface
	1*Audio I/O interface
	1*COM IO may vary
Language	Chinese, English, French, German, Italian, Japanese, Korean, Russian, Spanish etc.
Certificate of Approval	CE, FCC, RoHS, ISO
Installation	**VESA(100x100)without stand**/Embedded/Wall Mount/ Desktop
colour	Black /Silver
Material	Aluminium Alloy

Setting Up

You will find a VOREX blue banner app on the desk top. If you press it will go and find the target IP address we have set on test. This is usually 192.168.10.11, but it may vary, however only slightly (this will depend on which testing rig controller- Tridium, EASYIO, ISMA- used at the time the screen was tested and the app was added).

The Vorex app will run each time the screen is powered up it will always go and look for the target controller. The boot up time may vary slight, but this is around 45 seconds.

If you want to change the target IP address, put all five fingers on the screen and a URL box will pop up, fill it in and update it.

If you want to change the screen address you will need to go into SETTINGS (looks like a gear)

it is in the list off app on the main page, then MORE, ETHERNET, FIXED IP, again the settings menu may vary slightly based on the Android version installed, some versions auto save your setting other need a tick box to be saved. This will be in the top right corner of the fixed IP address screen.

Factory default settings:

192.168.10.20 screen address

192.168.10.1

255.255.255.0

8.8.8.8

8.8.4.4

Tony Hughes: vorex.consultancy@btinternet.com

077732 18678

Website: https://vorexconsultancy.com

Please note metal casings may vary slightly, however the PCB motherboard and the screen components are all the same.

Don’t Forget

Five fingers on the screen with allow you to set the target IP address and the screen will store the target.

Some screens are fitted with external push button which puts the screen to sleep and wakes it up. Drill a suitable hole near to the edge or the screen and in range of the USB port cable supplied and fit the button; only use the USB at the top of and to the rear of screen, marked with a silver label.

NOTE:

Running the screen on EASYIO you should have no real issues, if you have issues running N4 controllers with pop ups and icons try using default Hx , instead of HTML5 in your default and user setups

Port

COM：COM RS232，Optional RS422/485
USB：USB 2.0, Optional USB 3.0

8 inch-12 inch

Metal casing and outer trim design may vary slightly , but the internal parts are the same.

PULSE SPLITTERS

Our LPS range of Pulse Splitters do not require batteries. They provide a low cost solution for multiple logging from a single source. Our 2-way and 3-way splitters are enclosed to prevent damage from submersion. We also provide the option of a DIN rail mounted splitter for single channel input versions.

Our standard splitters are provided with bare ends, but can be terminated to suit customers requirements. We also provide the option of terminating the input with a meter specific reed switch. Input and output cables are approximately 1 meter in length.

PRODUCT	Input Channels	Number of Outputs	Enclosure type
LPS12	1	2	Fully potted box
LPS13	1	3	Fully potted box
LPS32	3	2	Fully potted box
LPS13-DIN	1	3	DIN RAIL MOUNTED

Cable Terminations

Depending on the customer requirements, cables can be terminated to suit various meters, data loggers and data acquisition systems.

We supply a large selection of connectors including, Souriau and MIL spec.

Place Holder

Industrial Ethernet Switches
Overview

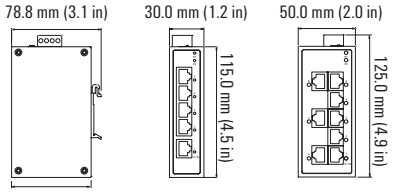
Unmanaged Switches
Adaptable and universal

Switches are the basic coupling elements in Ethernet networks. They connect the Ethernet participants together. In an Ethernet network the communication basically originates from the participants. The switches connect the participants together and enable the communication. Unmanaged switches are the simplest active network component. They do not need to be configured and are therefore very flexible. They use the basic standard protocols, such as auto-negotiation, auto-crossing, and flow-control and can automatically adjust to the different transmission speeds or connector wiring.

Unmanaged switches are protocol transparent. Each port on the switch creates an individual collision domain. The use of twisted-pair cabling with an RJ45 interface or fibre-optic cable based on the IEEE 802.3 specification interfaces are supported by all Weidmüller switches.

Unmanaged Fast Ethernet Switches

- 10/100BaseT(X) (RJ45 connector), 100BaseFX (multi/singlemode, SC or ST connector)
- Redundant dual 12/24/48 V DC, 18 to 30 V AC power inputs
- IP 30 aluminum housing
- Rugged hardware design well suited for hazardous locations (Class I Div. 2 /ATEX) and maritime environments (DNV/GL)
- –40 °C to 75 °C operating temperature range (T models)



Technical data

Technology		
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT (X) and 100BaseFX IEEE 802.3x for Flow Control	
Processing Type	Store and Forward	
Flow Control	IEEE 802.3x flow control, back pressure flow control	
Switch Properties		
MAC Table Size	1 K	
Packet Buffer Size	512 KBit	
Interface		
Fibre Ports	100BaseFX ports (SC/ST connector, multimode, singlemode)	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection	
DIP Switches	Enable/Disable broadcast storm protection	
LED Indicators	Power, 10/100M (TP port), 100M (fibre port)	
Optical Fibre		
	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. Transmit power	-10 dBm	0 dBm
Min. Transmit power	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)	40 km (9/125 µm singlemode cable)
Saturation	-6 dBm	-3 dBm
Power Requirements		
Input Voltage	12/24/48 V DC (9.6 to 60 V DC), 18 to 30 V AC (47 to 63 Hz), redundant dual inputs	
Input Current	IE SW BL05 5TX: 0.1 A @ 24 V IE SW BL05 1SC/1ST/1SCS: 0.11 A @ 24 V IE SW BL08 8TX: 0.13 A @ 24 V IE SW BL08 2SC/2ST/2SCS: 0.22 A @ 24 V IE SW BL08 1SC/1ST/1SCS: 0.17 A @ 24 V	
Overload Current Protection	1.1 A	
Connection	1 removable 4-contact terminal block	
Reverse Polarity Protection	Present	
Physical Characteristics		
Housing	Aluminum, IP 30 protection	
Dimensions (W x H x D)	IIE-SW-BL05-Series: 30 x 115 x 70 mm (1.18 x 4.52 x 2.76 in) IE-SW-BL08-Series: 50 x 115 x 70 mm (1.96 x 4.52 x 2.76 in)	
Weight	IE-SW-BL05-5TX: 175 g IE-SW-BL08-8TX: 275 g	
Installation	DIN-Rail mounting	
Environmental Limits		
Operating Temperature	Standard Models: -10 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)	
Storage Temperature	-40 to 85 °C (-40 to 185 °F)	

Environmental Limits	
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-11
Maritime	DNV, GL (not for 1412110000, 1412120000, 1412070000, 1412080000, 1412090000, 1412100000)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (meantime between failures)	
Time	IE-SW-BL05-Series: 3,040,784 hrs IE-SW-BL08-Series: 2,428,212 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

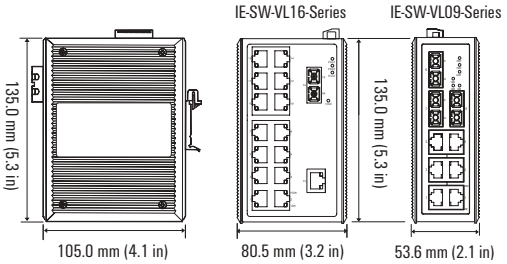
Port Variants	Model Type	Operating Temperature	Order No.
5 * RJ45	IE-SW-BL05-5TX	-10 to +60 °C	1240840000
	IE-SW-BL05T-5TX	-40 to +75 °C	1240850000
4 * RJ45, 1 * SC-Multimode	IE-SW-BL05-4TX-1SC	-10 to +60 °C	1240890000
	IE-SW-BL05T-4TX-1SC	-40 to +75 °C	1286550000
4 * RJ45, 1 * ST-Multimode	IE-SW-BL05-4TX-1ST	-10 to +60 °C	1240880000
	IE-SW-BL05T-4TX-1ST	-40 to +75 °C	1286540000
4 * RJ45, 1 * SC-Singlemode	IE-SW-BL05-4TX-1SCS	-10 to +60 °C	1240870000
	IE-SW-BL05T-4TX-1SCS	-40 to +75 °C	1286530000
8 * RJ45	IE-SW-BL08-8TX	-10 to +60 °C	1240900000
	IE-SW-BL08T-8TX	-40 to +75 °C	1286560000
6 * RJ45, 2 * SC-Multimode	IE-SW-BL08-6TX-2SC	-10 to +60 °C	1240910000
	IE-SW-BL08T-6TX-2SC	-40 to +75 °C	1240920000
6 * RJ45, 2 * ST-Multimode	IE-SW-BL08-6TX-2ST	-10 to +60 °C	1240930000
	IE-SW-BL08T-6TX-2ST	-40 to +75 °C	1286570000
6 * RJ45, 2 * SC-Singlemode	IE-SW-BL08-6TX-2SCS	-10 to +60 °C	1412110000
	IE-SW-BL08T-6TX-2SCS	-40 to +75 °C	1412120000
7 * RJ45, 1 * SC-Multimode	IE-SW-BL08-7TX-1SC	-10 to +60 °C	1412070000
	IE-SW-BL08T-7TX-1SC	-40 to +75 °C	1412080000
7 * RJ45, 1 * ST-Multimode	IE-SW-BL08-7TX-1ST	-10 to +60 °C	1412090000
	IE-SW-BL08T-7TX-1ST	-40 to +75 °C	1412100000
7 * RJ45, 1 * SC-Singlemode	IE-SW-BL08-7TX-1SCS	-10 to +60 °C	1240950000
	IE-SW-BL08T-7TX-1SCS	-40 to +75 °C	1286580000

Accessories

	Model Type	Order No.
19" Rack Mounting Kit	RM-KIT	1241440000
Cable fixing kit	IE-CFK-05	1339610000

Unmanaged Fast Ethernet Switches

- Redundant dual 24 V DC power inputs
- Relay output warning for power failure and port break alarm
- Broadcast storm protection
- Transparent transmission of VLAN tagged packets
- –40 °C to 75 °C operating temperature range (T models)



Technical data

Technology	
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Switch Properties	
MAC Table Size	1 K (IE-SW-VL09...Series), 4 K (IE-SW-VL16...Series)
Packet Buffer Size	512 Kbit (IE-SW-VL09...Series), 1.25 MBit (IE-SW-VL16...Series)
Interface	
Fibre Ports	100BaseFX ports (SC/ST connector)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches	Port fault alarm Enable/disable broadcast storm protection
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP port), 100M (fibre port)
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC
Optical Fibre	
	100BaseFX
	multimode
Wavelength	1300 nm
Max. TX	-10 dBm
Min. TX	-20 dBm
RX Sensitivity	-32 dBm
Link Budget	12 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)
Saturation	-6 dBm
Power Requirements	
Input Voltage	IE-SW-VL09: 24 V DC (12 to 45 V DC), redundant dual inputs IE-SW-VL16: 12/24/48 V DC (9.6 to 60 V DC), redundant dual inputs
Input Current	IE-SW-VL09T-6TX-3SC: 0.31 A @ 24 V IE-SW-VL16-16TX: 0.27 A @ 24 V IE-SW-VL16 SC/ST: 0.44 A @ 24 V
Overload Current Protection	1.6 A
Connection	1 removable 6-pin terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	IE-SW-VL09...Series: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in) IE-SW-VL16...Series: 80.5 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)
Weight	IE-SW-VL09: 790 g IE-SW-VL16: 1140 g

Physical Characteristics	
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1 CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3;
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	IE-SW-VL09...Series: 396,000 hrs IE-SW-VL16...Series: 257,000 hrs
Database	MIL-HDBK-217F, GB 25 °C
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
16 * RJ45	IE-SW-VL16-16TX	0 to +60 °C	1241000000
	IE-SW-VL16T-16TX	-40 to +75 °C	1286590000
6 * RJ45, 3 * SC-Multimode	IE-SW-VL09T-6TX-3SC	-40 to +75 °C	1240980000
14 * RJ45, 2 * SC-Multimode	IE-SW-VL16-14TX-2SC	0 to +60 °C	1241030000
	IE-SW-VL16T-14TX-2SC	-40 to +75 °C	1286610000
14 * RJ45, 2 * ST-Multimode	IE-SW-VL16-14TX-2ST	0 to +60 °C	1241050000
	IE-SW-VL16T-14TX-2ST	-40 to +75 °C	1286620000

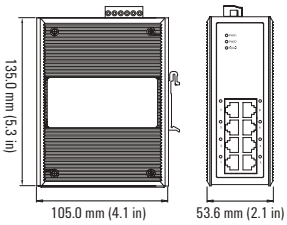
Accessories

	Model Type	Order No.
19" Rack Mounting Kit	RM-KIT	1241440000

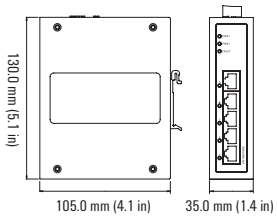
Unmanaged Gigabit Ethernet Switches

- Full Gigabit Ethernet on all ports
- Variants with slots for Gigabit SFP transceivers
- Redundant dual 12/24/48 V DC power inputs
- Relay output warning for power failure and port break alarm
- Broadcast storm protection
- Supports jumbo frame transmission (up to 9.6 KB)

IE-SW-VL08-xGT-Series



IE-SW-BL05GT-Series



Technical data

Technology	
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3ab for 1000BaseT(X) IEEE 802.3z for 1000BaseX IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Switch Properties	
MAC Table Size	8 K
Packet Buffer Size	1088 KBit (IE-SW-BL05-5GT), 1408 KBit (IE-SW-VL08-xGT)
Jumbo frame support	up to 9.6 KB
Interface	
Fibre Ports	100/1000BaseSFP slot (only IE-SW-VL08-6GT-2GS)
RJ45 Ports	10/100/1000BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches	Port fault alarm Enable/disable broadcast storm protection Enable/disable jumbo frame support
LED Indicators	PWR1, PWR2, FAULT, 10/100/1000M
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC
Power Requirements	
Input Voltage	12/24/48 V DC (9.6 to 60 V DC), redundant dual inputs
Input Current	IE-SW-BL05-5GT: 0.20 A @ 24 V IE-SW-VL08-8GT: 0.32 A @ 24 V IE-SW-VL08-6GT-2GS: 0.34 A @ 24 V
Connection	1 removable 6-contact terminal block
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	IE-SW-BL05-5GT: 35 x 130 x 105 mm (1.37 x 5.12 x 4.13 in) IE-SW-VL08-xGT: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	IE-SW-BL05-5GT: 290 g IE-SW-VL08-8GT 630 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F) (on request)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A

Regulatory Approvals	
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	478.000 hrs (Serie IE-SW-BL05-5GT) 325.000 hrs (Serie IE-SW-VL08-XGT)
Database	Telcordia (Bellcore), GB (IE-SW-VL08-xGT series)
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
5 * RJ45 10/100/1000BaseT(X)	IE-SW-BL05-5GT	0 to 60 °C	**1241250000**
	IE-SW-BL05T-5GT	-40 to +75 °C	**1286850000**
8 * RJ45 10/100/1000BaseT(X)	IE-SW-VL08-8GT	0 to +60 °C	**1241270000**
	IE-SW-VL08T-8GT	-40 to +75 °C	**1286860000**
6 * RJ45 10/100/1000BaseT(X), 2 Combo Ports (10/100/1000 BaseT(X) or 100/1000BaseSFP)	IE-SW-VL08-6GT-2GS	0 to +60 °C	**1241280000**
	IE-SW-VL08T-6GT-2GS	-40 to +75 °C	**1286870000**

Accessories

	Model Type	Order No.
19" Rack Mounting Kit	RM-KIT	**1241440000**

Note

The IE-SW-VL08-6GT-2GS supports up to 2 100/1000Base SFP slots. Corresponding SFP modules for Fast/Gigabit Ethernet, see page F.6.

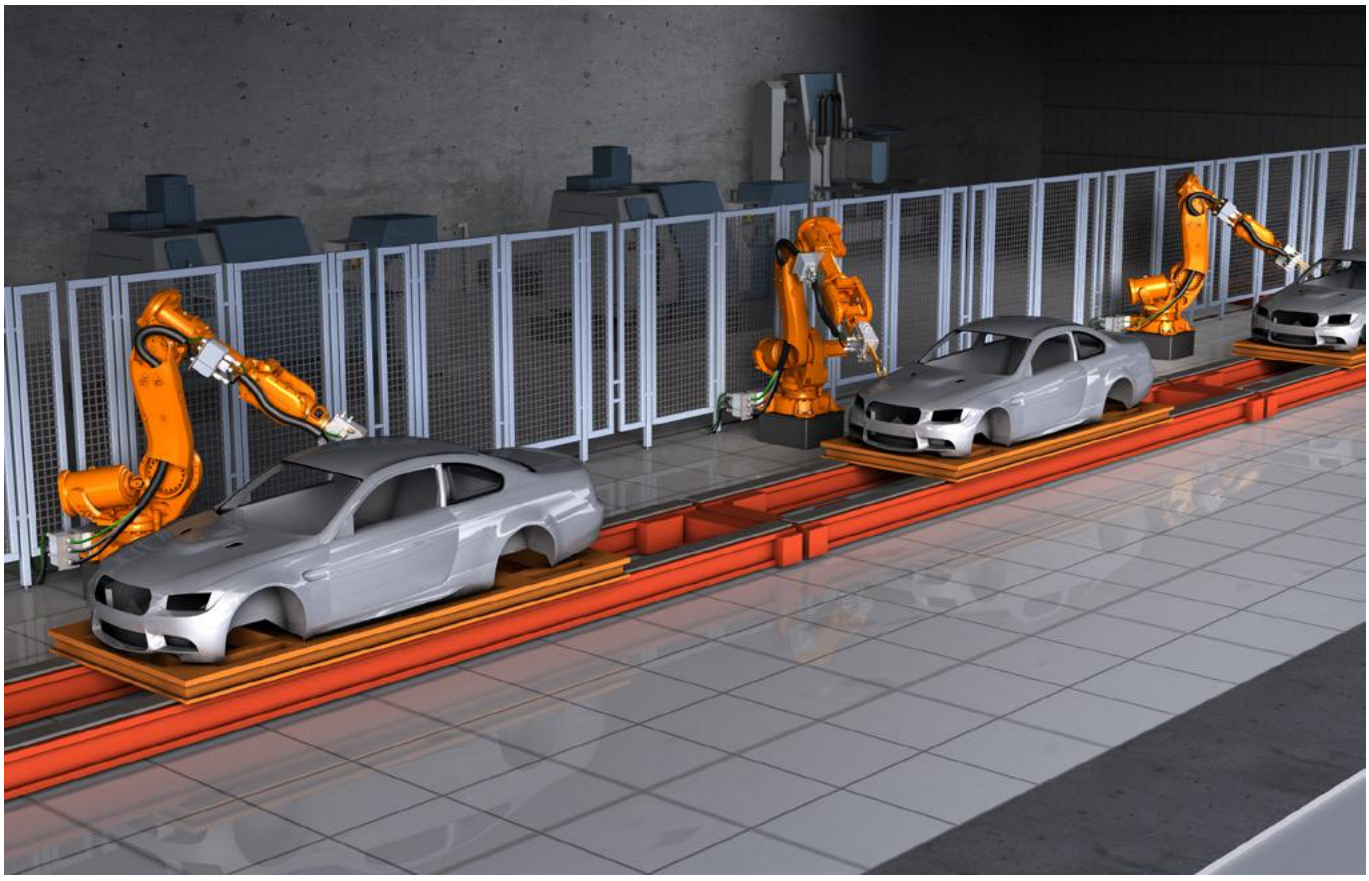
Managed Switches

Configurable according to requirements

Managed switches offer extensive control mechanisms for data distribution and bandwidth management to co-ordinate and cope with the different requirements of communication participants in an industrial network. Configuration is either web-based using a simple and intuitive user interface or via a serial console.

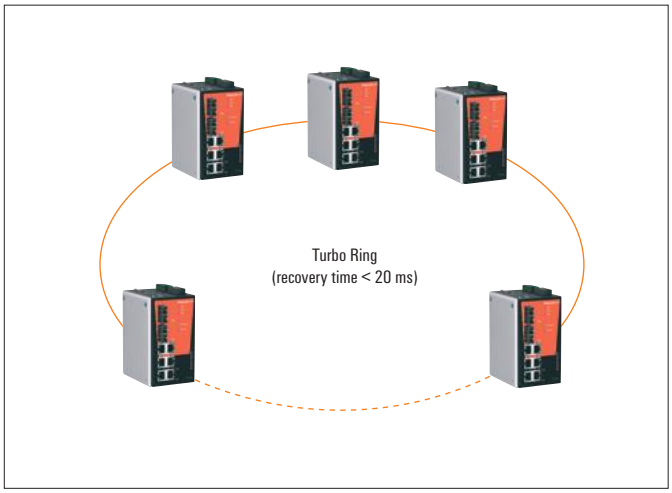
Powerful and reliable network redundancy

It is particularly important to have network redundancy to ensure system availability in today's Industrial Ethernet infrastructures. This is because in a highly integrated system, a connection error can lead to machine stoppage and thus to production losses. To minimise such risks in a managed Ethernet network, Weidmüller has integrated high-performance redundancy mechanisms into its managed switches. This is in addition to the RSTP/STP standard and port-trunking.



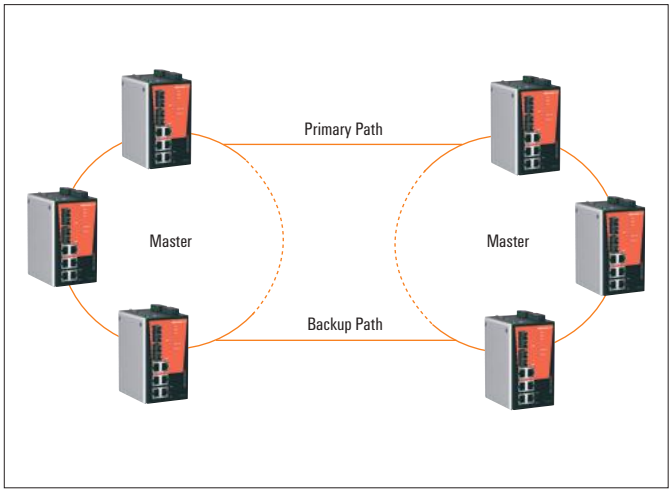
Ring redundancy

The Turbo-Ring technology integrated into Weidmüller's switches allows you to restore a network connection in case of failure in under 20 ms, and this with up to 250 switches in a ring. Turbo-Ring offers thee different topology options (Ring-Coupling, Dual-Ring and Dual-Homing) for different application requirements to ensure the maximum possible availability of industrial network applications.



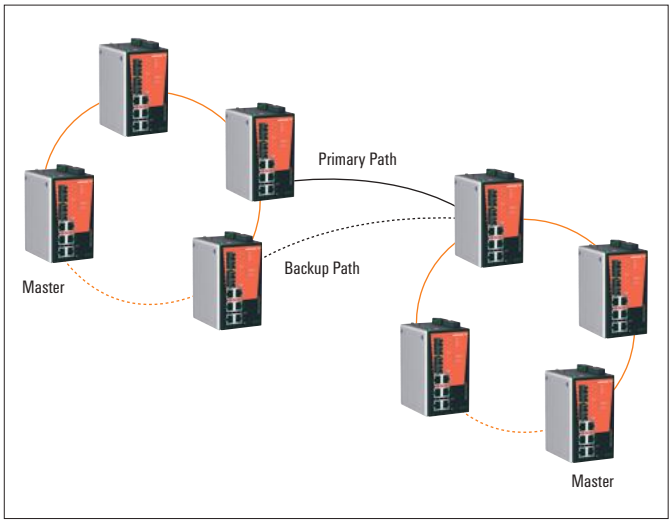
Ring-Coupling

In some applications, it is not sensible to have all equipment and devices in a single large redundant ring networked together, as some of the devices may be located in remote parts of the plant. For such structures, Ring-Coupling is ideal. It connects devices in multiple, smaller rings that are connected redundantly and directly with one another.



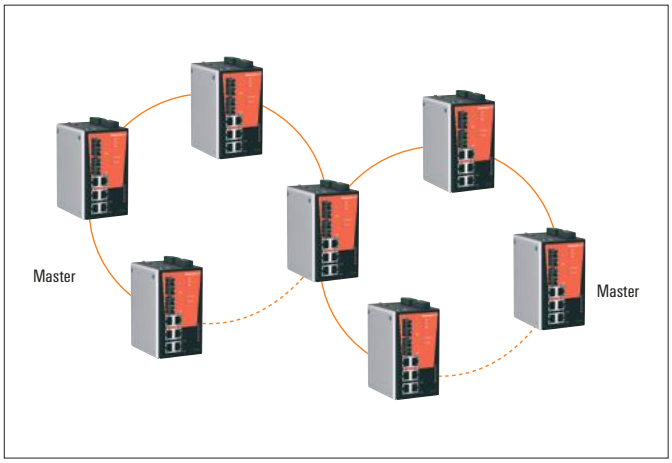
Dual-Homing

With Dual-Homing, two separate rings are connected through one managed switch via two independent connection points. The back-up connection is activated if the primary connection fails.



Dual-Ring

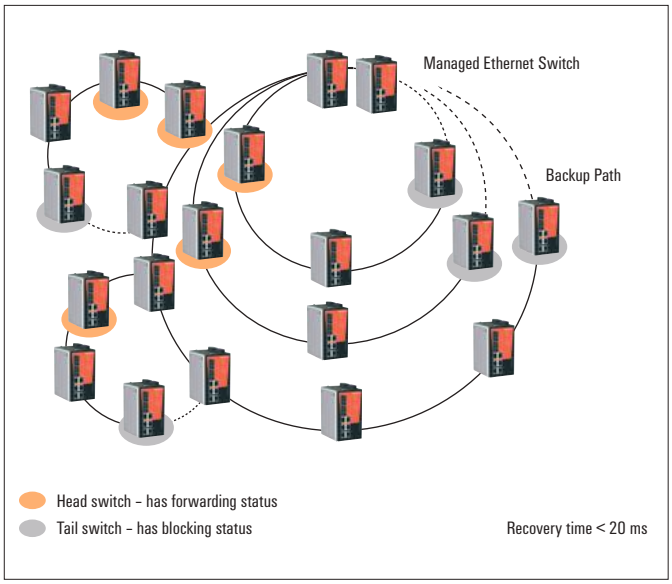
In a Dual-Ring, two neighbouring rings are connected with one another using one switch, without the need for additional ports or cabling. This configuration reduces the total number of ports and saves cabling costs, as an additional primary and back-up line is not needed.



Turbo-Chain

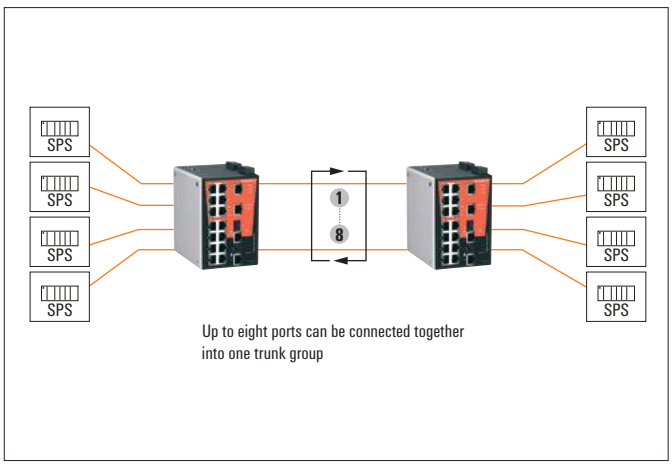
Turbo-Chain offers the possibility of creating multiple redundant networks without the limitations of ring technology. Turbo-Chain can be simply configured by defining two end-points in a segment. This means you can connect or extend existing redundant networks. When compared with traditional ring coupling or a network re-design, Turbo-Chain is more flexible as well as being more cost efficient and it has significant savings potential when compared to the effort for network restructuring and re-cabling. In addition Turbo Chain also supports IEEE 802.1w/D RSTP and STP protocols.

- Flexible network topology
- Unlimited and simple network expansion
- Quick troubleshooting (recovery time < 20 ms)
- Cost-effective configurations



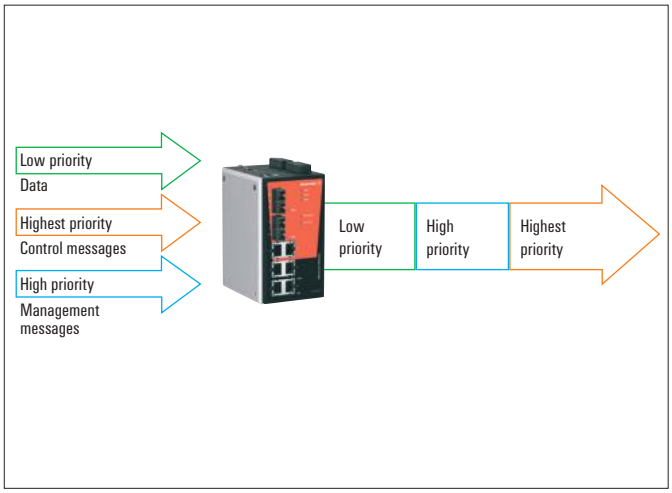
Port trunking for flexible connections

IEEE 802.3ad (LACP, Link Aggregation Control Protocol) permits flexible network connections and a redundant path for critical applications. It provides the means for a user to link via a higher bandwidth over the PremiumLine managed switches by combining more ports into a trunk group.



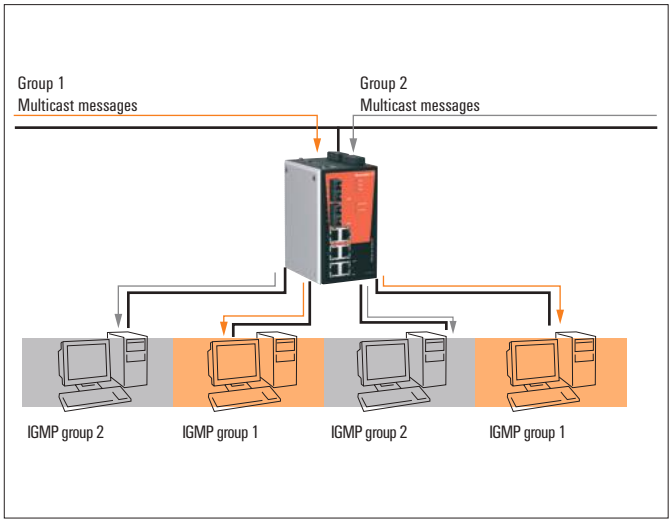
QoS supports real-time capability

Quality of Service (QoS) enables the possibility of prioritisation of data traffic in a network and ensures that important data is consistently available. Weidmüller managed switches can deal with IEEE 802.1p/1Q layer 2 CoS tags and also layer 3 TOS information. The QoS functionality of Weidmüller's managed switches improves network performance and ensures that time-critical applications are given priority.



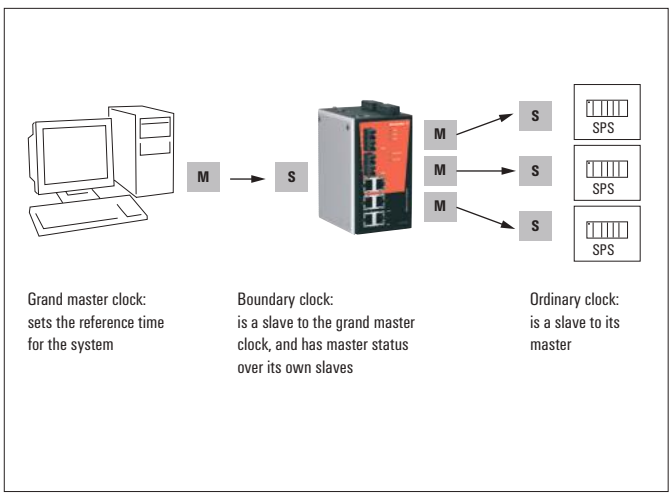
IGMP snooping and GMRP for filtering multicast data traffic

Weidmüller managed switches support GMRP (Generic Multicast Registration Protocol) and IGMP snooping. These protocols limit multicast data traffic so that it is only forwarded to the devices that actually require it. This reduces unnecessary network data traffic.



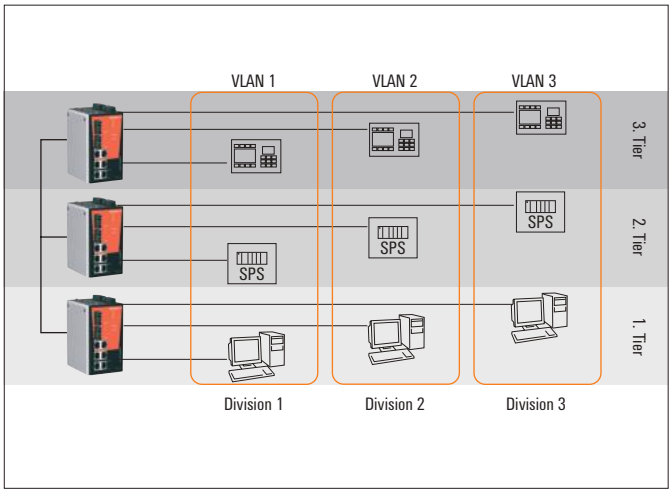
IEEE 1588 PTP - improves time synchronisation of automation devices

IEEE 1588 PTP, also known as Precision Time Protocol (PTP), was developed to synchronise real-time clocks which are located at specific nodes of a distributed system. Weidmüller managed switches with IEEE 1588 PTP are particularly suited for motion control applications where distributed clocks must be synchronised with high levels of accuracy.



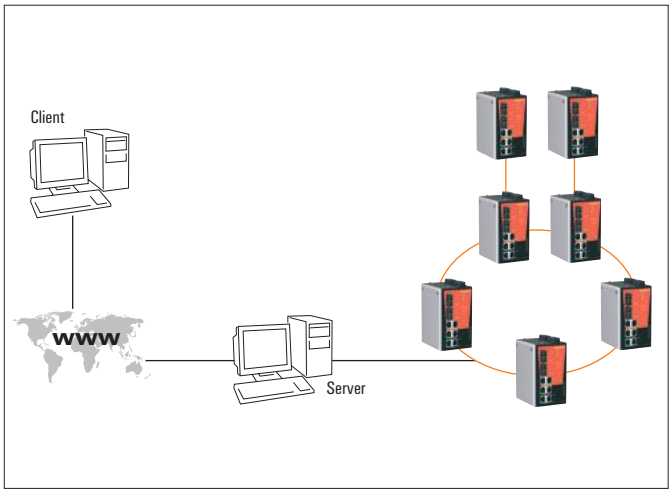
VLAN – simplifies network planning

VLAN stands for virtual LAN. It is a network structure with all the characteristics of a normal LAN, but not geographically constrained. A network can be divided into different sections using the VLAN function. It is possible, for example, to group servers or workstations together, based on their function. Data will only then be sent to Ethernet devices of a specific VLAN group. The option for isolating VLANs completely from one another serves to increase the security of data transfer and offers additional protection from unauthorised access or unauthorised data traffic.



Automatic topology detection using LLDP

The Link Layer Discovery Protocol (LLDP - IEEE 802.1AB) is a data link layer protocol which publishes information about a device containing its IP address, description and functional information to its neighbouring devices over the network. All of Weidmüller's managed switches fully support LLDP.

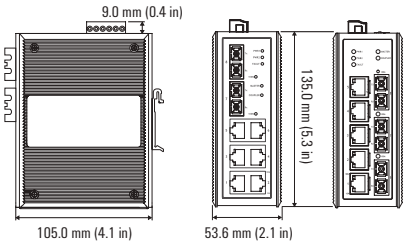


Simple browser based configuration

Weidmüller's managed switches can be easily configured using a web browser, telnet console or the Weidmüller switch configuration utility. Further switch configurations can be saved or the firmware updated using this user-friendly tool.

Managed Entry-level Ethernet Switches

- Turbo Ring and Turbo Chain with fast recovery time (<20 ms @ 250 switches)
- IGMP snooping, QoS, port- and tag-based VLAN
- Configurable error messages via SNMP trap, e-mail or relay output
- User-friendly, web-based configuration and management
- External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT(X) and 100BaseFX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1Q for VLAN Tagging	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ Telnet ▪ Syslog ▪ DHCP Option 66/67/82 ▪ BootP ▪ LLDP ▪ Modbus/TCP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-like MIB ▪ P-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
Fibre Ports	100BaseFX ports (SC/ST connector)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC

Optical Fibre	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a]	40 km [c]
	4 km [b]	
Saturation	-6 dBm	-3 dBm

[a] 50/125 µm, 800 MHz*km fibre optic cable
[b] 62.5/125 µm, 500 MHz*km fibre optic cable
[c] 9/125 µm singlemode fibre optic cable

Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-VL08M-8TX: 0.26 A @ 24 V IE-SW-VL08M-6TX-2ST/SC: 0.35 A @ 24 V IE-SW-VL08M-5TX-3SC: 0.32 A @ 24 V
Overload Current Protection	Present
Connection	1 removable 6-contact terminal block
Reverse Polarity Protection	Present

Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	IE-SW-VL08MT-...8TX/6TX-2SC/6TX-2ST/6TX-2SCS: 650 g IE-SW-VL08MT-...5TX/3SC/5TX-1SC-2SCS: 890 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	-40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC (not for 1345240000)
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Maritime	DNV, GL (not 1345240000 and 1344770000)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	1,102,845 hrs (IE-SW-VL08MT-6TX/8TX devices) 363,000 hrs (IE-SW-VL08MT-5TX devices)
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

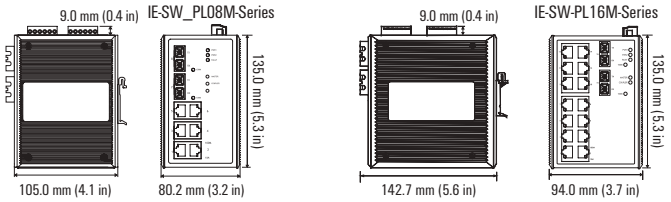
Port Variants	Model Type	Operating Temperature	Order No.
8 * RJ45	IE-SW-VL08MT-8TX	-40 to +75 °C	**1240940000**
5 * RJ45, 3 * SC-Multimode	IE-SW-VL08MT-5TX-3SC	-40 to +75 °C	**1240970000**
5 * RJ45, 1 * SC-Multimode, 2 * SC-Singlemode	IE-SW-VL08MT-5TX-1SC-2SCS	-40 to +75 °C	**1345240000**
6 * RJ45, 2 * ST-Multimode	IE-SW-VL08MT-6TX-2ST	-40 to +75 °C	**1240990000**
6 * RJ45, 2 * SC-Multimode	IE-SW-VL08MT-6TX-2SC	-40 to +75 °C	**1344770000**
6 * RJ45, 2 * SC-Singlemode	IE-SW-VL08MT-6TX-2SCS	-40 to +75 °C	**1241020000**

Accessories

	Model Type	Order No.
External Backup and Restore Module	EBR-Module RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

Managed Fast Ethernet Switches

- Plug-n-play Turbo Ring and Turbo Chain (<20 ms @ 250 switches), RSTP/STP (IEEE 802.1w/D) for Ethernet redundancy
- IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module (External Backup and Restore Module) for system configuration backup (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ GMRP ▪ LACP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ Syslog ▪ DHCP Option 66/67/82 ▪ SSH ▪ SNMP Inform ▪ Modbus/TCP ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit (IE-SW-PL08M), 2 MBit (IE-SW-PL16M)
Interface	
Fibre Ports	100BaseFX ports (SC/ST connector)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo-ring, master, coupler, reserve (only IE-SW-PL08M)
LED Indicators	PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, electrically isolated • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA

Optical Fibre	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)	40 km (9/125 µm singlemode cable)
Saturation	-6 dBm	-3 dBm

Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-PL08M-8TX: 0.26 A @ 24 V IE-SW-PL08M-6TX-2SC/ST/2SCS: 0.36 A @ 24 V IE-SW-PL16M-16TX: 0.41 A @ 24 V IE-SW-PL16M-14TX-2SC/ST: 0.51 A @ 24 V

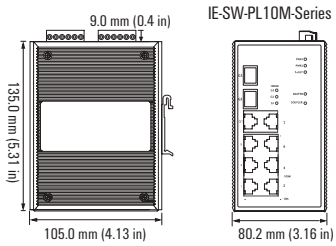
Power Requirements	
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	IE-SW-PL08M: 80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in) IE-SW-PL16M: 94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight	IE-SW-PL08M: 1040 g, IE-SW-PL16M: 1586 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F) (on request)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD): IE-SW-PL08M...Series: level 3 IE-SW-PL16M...Series: level 2; EN61000-4-3 (RS) level 3; EN61000-4-4 (EFT) level 3; EN61000-4-5 (Surge) level 3; EN61000-4-6 (CS) level 3; EN61000-4-8
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	IE-SW-PL08M...Series: 339,000 hrs IE-SW-PL16M...Series: 247,000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
8 * RJ45	IE-SW-PL08M-8TX	0 to 60 °C	1241040000
	IE-SW-PL08MT-8TX	-40 to +75 °C	1286780000
6 * RJ45, 2 * SC-Multimode	IE-SW-PL08M-6TX-2SC	0 to 60 °C	1241070000
	IE-SW-PL08MT-6TX-2SC	-40 to +75 °C	1286790000
6 * RJ45, 2 * ST-Multimode	IE-SW-PL08M-6TX-2ST	0 to 60 °C	1241080000
	IE-SW-PL08MT-6TX-2ST	-40 to +75 °C	1286800000
6 * RJ45, 2 * SC-Singlemode	IE-SW-PL08M-6TX-2SCS	0 to 60 °C	1241090000
	IE-SW-PL08MT-6TX-2SCS	-40 to +75 °C	1286810000
16 * RJ45	IE-SW-PL16M-16TX	0 to 60 °C	1241100000
	IE-SW-PL16MT-16TX	-40 to +75 °C	1286820000
14 * RJ45, 2 * SC-Multimode	IE-SW-PL16M-14TX-2SC	0 to 60 °C	1241120000
	IE-SW-PL16MT-14TX-2SC	-40 to +75 °C	1286830000
14 * RJ45, 2 * ST-Multimode	IE-SW-PL16M-14TX-2ST	0 to 60 °C	1241130000
	IE-SW-PL16MT-14TX-2ST	-40 to +75 °C	1286840000

Managed Gigabit Ethernet Switches

- 2 Gigabit Ethernet ports for redundant ring and 1 Gigabit Ethernet port for uplink solution
- Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
- EEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module - External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3ab for 1000BaseT(X) ▪ IEEE 802.3z for 1000BaseX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ Syslog ▪ DHCP Option 66/67/82 ▪ SSH ▪ SNMP Inform ▪ Modbus/TCP ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
Fibre Ports	1000BaseSFP-Slot (100BaseSFP modules are not supported)
RJ45 Ports	10/100BaseT(X) oder 10/100/1000BaseT(X) auto negotiation
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo-Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP-Port), 1000M (Gigabit-Port), MSTR/HEAD, CPLR/TAIL
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, but electrically isolated from the electronics • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA
Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-PL10M-3GT-7TX: 0.65 A @ 24 V IE-SW-PL10M-1GT-2GS-7TX: 0.44 A @ 24 V
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)
Weight	1170 g
Installation	DIN-Rail mounting

Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F); Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) Class A
EMC	EN61000-4-2 (ESD),level 3; EN61000-4-3 (RS),level 3; EN61000-4-4 (EFT),level 3; EN61000-4-5 (Surge),level 3; EN61000-4-6 (CS),level 3; EN61000-4-8
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	204.000 hrs
Database	MIL-HDBK-217J, GB 25 °C
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
3 * RJ45 10/100/1000BaseT(X), 7 * RJ45 10/100BaseT(X)	IE-SW-PL10M-3GT-7TX	0 to 60 °C	**1241290000**
	IE-SW-PL10MT-3GT-7TX	-40 to +75 °C	**1286930000**
1 * RJ45 10/100/1000BaseT(X), 2 * Slots 1000BaseSFP, 7 * RJ45 10/100BaseT(X)	IE-SW-PL10M-1GT-2GS-7TX	0 to 60 °C	**1241300000**
	IE-SW-PL10MT-1GT-2GS-7TX	-40 to +75 °C	**1286940000**

Accessories

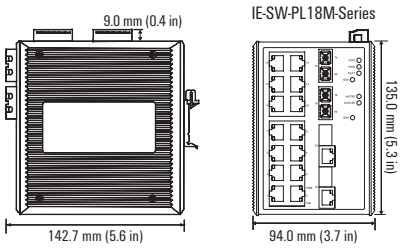
	Model Type	Order No.
External Backup and Restore Module	EBR-Modul RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

Note

The IE-SW-PL10M 1GT-2GS-7TX supports up to 2 1000Base SFP slots. Corresponding SFP modules for Gigabit Ethernet, see page F.6.

Managed Gigabit Ethernet Switches

- 2 Gigabit Ethernet ports plus 16 Fast Ethernet ports for copper and fibre
- Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
- EEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module - External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT(X) and 100BaseFX ▪ IEEE 802.3ab for 1000BaseT(X) ▪ IEEE 802.3z for 1000BaseX IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port-Trunk mit LACP	
Protocols	
IGMPv1/v2 ▪ GMRP, GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ Syslog ▪ DHCP-Option 66/67/82 ▪ SSH ▪ SNMP Inform ▪ Modbus/TCP ▪ LLDP ▪ EEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	2 MBit
Interface	
Fibre Ports	100BaseFX (SC/ST connection) and 1000BaseSFP slot (100BaseSFP modules are not supported)
RJ45 Ports	10/100BaseT(X) oder 10/100/1000BaseT(X) auto negotiation
Console Port	RS 232 (RJ45 connector)
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP-Port), 100M (Glasfaser-Port), MSTR/HEAD, CPLR/TAIL
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, but electrically isolated from the electronics. • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA

Optical Fibre	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)	40 km (9/125 µm singlemode cable)
Saturation	-6 dBm	-3 dBm

Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-PL18M-2GC-16TX: 0.51 A @ 24 V IE-SW-PL18M-SC/ST/SCS: 0.61 A @ 24 V
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight	1630 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC
EMC	FCC Part 15, CISPR (EN55022) Class A EN61000-4-2 (ESD), level 2; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 2; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-12
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	240.000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
16 * RJ45 10/100BaseT(X), 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC-16TX IE-SW-PL18MT-2GC-16TX	0 to +60 °C -40 to +75 °C	**1241320000** **1286970000**
14 * RJ45 10/100BaseT(X), 2 * SC-Multimode 100FX, 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC14TX2SC IE-SW-PL18MT-2GC14TX2SC	0 to +60 °C -40 to +75 °C	**1241330000** **1286990000**
14 * RJ45 10/100BaseT(X), 2 * ST-Multimode 100FX, 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC14TX2ST IE-SW-PL18MT-2GC14TX2ST	0 to +60 °C -40 to +75 °C	**1241340000** **1287000000**
14 * RJ45 10/100BaseT(X), 2 * SC-Singlemode 100FX, 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC14TX2SCS IE-SW-PL18MT-2GC14TX2SCS	0 to +60 °C -40 to +75 °C	**1241350000** **1287010000**

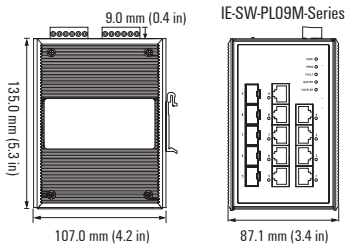
Note

The IE-SW-PL18M series supports up to 2 1000Base SFP slots. Corresponding SFP modules for Gigabit Ethernet, see page F.6.

[1] (10/100/1000BaseT(X) or 100/1000BaseSFP)

Managed Full Gigabit Ethernet Switch

- 4 10/100/1000BaseT(X) ports plus 5 combo (10/100/1000BaseT(X) or 100/1000BaseSFP slot) Gigabit ports
- Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
- IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module - External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3ab for 1000BaseT(X) ▪ IEEE 802.3z for 1000BaseX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ DHCP Option 66/67/82 ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ SSH ▪ Syslog ▪ Modbus/TCP ▪ SNMP Inform ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	ID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
Fibre Ports	100/1000Base SFP Slot
RJ45 Ports	10/100/1000BaseT(X) auto negotiation
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo-Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, 10/100/1000M, MSTR/HEAD, CPLR/TAIL
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, but electrically isolated from the electronics • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA
Power Requirements	
Input Voltage	12/24/48 V DC, redundant dual inputs
Input Current	0.81 A @ 24 V
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	87.1 × 135 × 107 mm (3.43 × 5.31 × 4.21 in)
Weight	1510 g
Installation	DIN-Rail mounting

Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, EN60950-1
Hazardous Location	UL/cUL, Class I Division 2, Groups A, B, C and D (Pending); ATEX-Zone 2, Ex nC IIC (Pending)
EMI	FCC Part 15, CISPR (EN55022) Class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Maritime	DNV
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	330.000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
4 * RJ45 10/100/1000BaseT(X)	IE-SW-PL09M-5GC-4GT	0 to 60 °C	**1241370000**
5 * Kombi-Ports[1]	IE-SW-PL09MT-5GC-4GT	-40 to +75 °C	**1287020000**

Accessories

	Model Type	Order No.
External Backup and Restore Module	EBR-Modul RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

Note

The IE-SW-PL09M series supports up to 5 100/1000Base SFP slots. Corresponding SFP modules for Fast/Gigabit Ethernet, see page F.6.

[1] (10/100/1000BaseT(X) or 100/1000BaseSFP)

Power-over-Ethernet switches
Power and data transferred in parallel

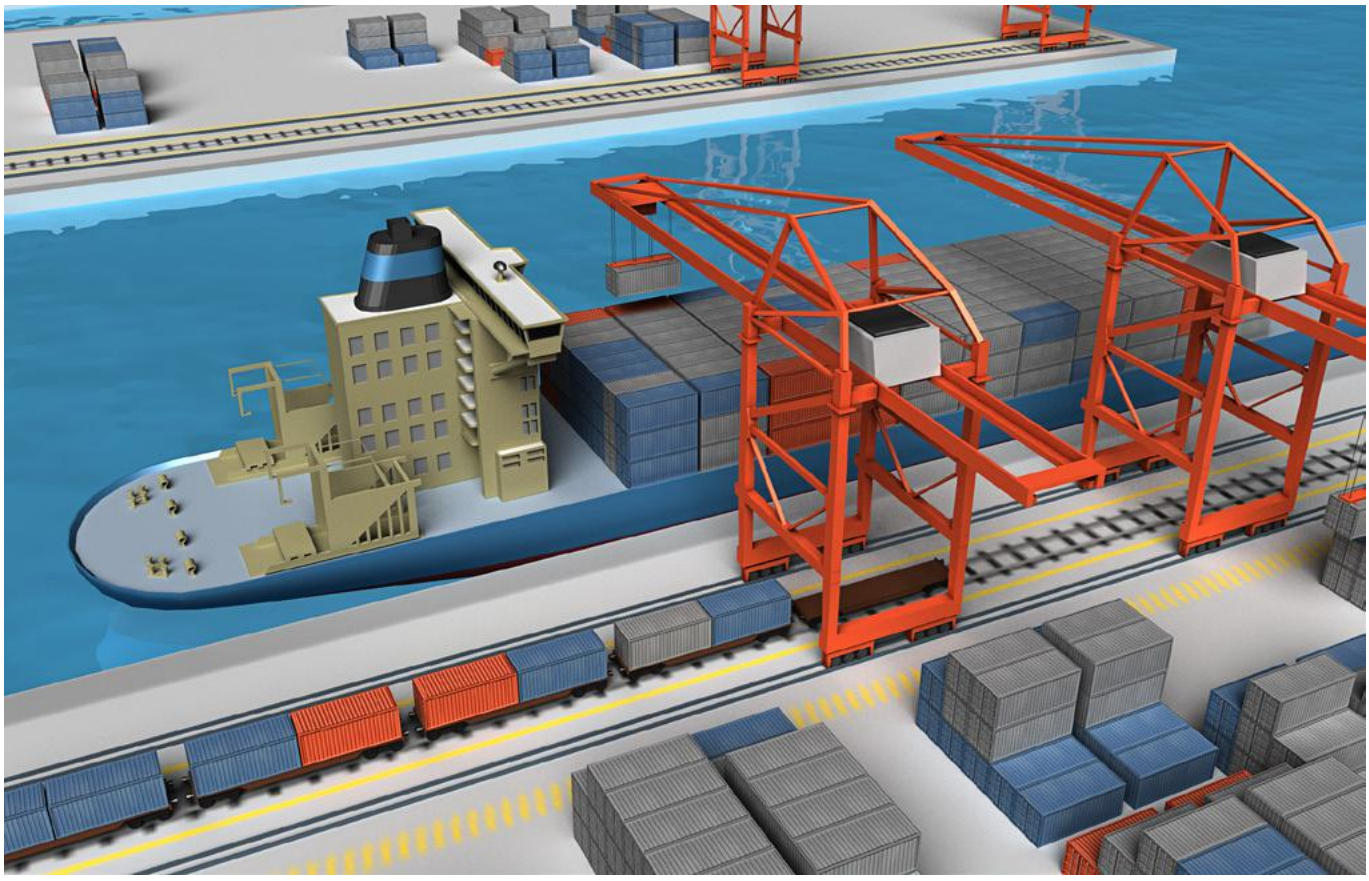
Power over Ethernet (PoE) describes a process where power can be supplied to a network-compatible device over the 8-wire Ethernet cable. In a narrower sense, PoE today means the IEEE 802.3af (DTE Power over MDI) standard which was adopted in June 2003.

The main advantage of Power over Ethernet is that you do not require a separate power supply cable and so can install Ethernet devices in hard-to-reach places or in areas where there is not sufficient room for many cables. This means that you can save some significant installation costs, and that you can also integrate the power supply into a central uninterruptible power supply (UPS) to improve the reliability of the connected devices.

PoE is used by network devices that need small amounts of power. It is typically used for IP telephones, network cameras, operating panels or wireless communications devices such as WLAN access points.

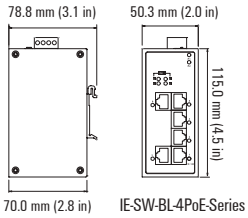
Weidmüller PoE switches support the IEE 802.3at standard (also known as PoE+) and can therefore supply end devices with up to 30 W per PoE port.

Weidmüller PoE switches also offer further advantages by their simple power supply needs. They do not require an additional 48 V supply in addition to the standard 24 V supply.



6-port IEEE 802.3af/at PoE+ unmanaged Ethernet Switch

- 4 IEEE 802.3af/at compliant PoE ports
- Up to 30 watts per PoE port
- 24/48 V DC redundant wide-range power supply
- Integrated DC/DC converter can supply 48 V-PoE devices across the entire input voltage range of 24 to 48 V DC
- Intelligent power consumption detection and classification
- Redundant dual V DC power inputs
- Broadcast Storm Protection



IE-SW-BL-4PoE-Series

Technical data

Technology	
Standards	802.3af/at for Power-over-Ethernet IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Switch Properties	
MAC table size	1 K
Packet buffer size	512 KB
Interface	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode and auto MDI/MDI-X connection
DIP Switches	Enable/disable broadcast storm protection
PoE pin assignment	V-, V-, V+, V+ for pin 1, 2, 3, 6 (endspan, MDI-X alternative A)
LED Indicators	PWR1, PWR2, 10/100M, PoE
Power Requirements	
Input Voltage	24/48 (20 to 60 V) V DC, 2 redundant inputs
Input Current	Max 7.5 A @ 24 V DC (supports up to 4 ports at 30 watts per PoE port)
Overload Current Protection	Present
Connection	1 removable 4-contact terminal block
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Aluminium, IP 30 protection
Dimensions (W x H x D)	50 × 115 × 70 mm (1.96 x 4.52 x 2.76 in)
Weight	375 g
Installation	TS 35
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	645.138 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

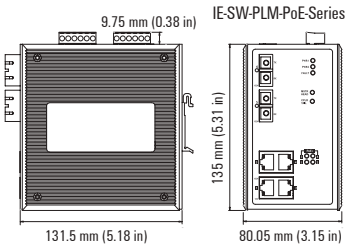
Port Variants	Type	Operating Temperature	Order No.
2 * RJ45 10/100 BaseT(X), 4 * RJ45 10/100 BaseT(X) PoE+	IE-SW-BL06-2TX-4POE	0 to 60 °C	1241380000
	IE-SW-BL06T-2TX-4POE	-40 to +75 °C	1286920000

Accessories

	Type	Order No.
19" Rack Mounting Kit	RM-KIT	1241440000
Cable fixing kit	IE-CFK-05	1339610000

6-port IEEE 802.3af/at PoE+ managed Ethernet Switch

- 4 IEEE 802.3af/at compliant PoE ports
- Up to 30 watts per PoE port
- 24/48 V DC redundant wide-range power supply
- Integrated DC/DC converter can supply 48 V-PoE devices across the entire input voltage range of 24 to 48 V DC
- Extended PoE management functions, including PoE error checking or configuring the operational times of connected PoE devices



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Technical data

Standards	
IEEE 802.3at/af for Power-over-Ethernet ▪ IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ DHCP Option 66/67/82 ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ SSH ▪ Syslog ▪ Modbus/TCP ▪ SNMP Inform ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode and auto MDI/MDI-X connection
PoE pin assignment	V-, V-, V+, V+ for pin 1, 2, 3, 6 (endspan, MDI-X alternative A)
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, 10/100M, MSTR/HEAD, CPLR/TAIL, PoE
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Alarm Contact	2 inputs with the same ground, electrically isolated • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA
Power Requirements	
Input Voltage	24/48 (20 to 60 V) V DC
Input Current	Max. 7.8 A @ 24 V DC (supports up to 4 ports at 30 watts per PoE port)
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Technical data	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	80 x 135 x 131.5 mm (3.15 x 5.31 x 5.18 in)
Weight	1270 g
Installation	DIN-Rail mounting

Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Operating Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	433.000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering data

Port Variants	Type	Operating Temperature	Order No.
2 * RJ45 10/100 BaseT(X), 4 * RJ45	IE-SW-PL06M-2TX-4PoE	0 to 60 °C	**1241390000**
10/100 BaseT(X) PoE+	IE-SW-PL06MT-2TX-4PoE	-40 to +75 °C	**1286910000**

Accessories

	Type	Order No.
External Backup and Restore Module	EBR-Modul RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

Integrated Building Management Systems Ltd.
Brunel Drive, Newark, Notts. NG24 2DE.
Telephone: - (01636) 674875
Web: - http://www.integratedbms.co.uk/ E-mail: - mailto:Controls@integratedbms.co.uk

4606
Calder Park
BMS Control System

Plant Operation & Controls Manual

This O&M has been prepared for:

Winvic Construction
Peel Avaneue
Calder Park
Wakefield
WF2 7UA

12/07/2022

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Section 1
Description of Operation

12/07/2022

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Section 2
Controls Drawings

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Section 3
Test Certificates

12/07/2022

SECTION 3 CONTENTS

TEST CERTIFICATES

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Section 4
BMS Data Sheets

12/07/2022

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BMS EQUIPMENT DATA SHEETS

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Section 5
BMS Maintenance Instructions

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Description of Operation for the Building Management System at

Calder Park, Wakefield

Date: 13/04/2022
Prepared by: RH
iBMS Reference: 4606 DesOps Rev A

Contents

1 Revision History

Revision	Date	Change Summary	By
A	13/04/22	Initial Issue	RH

2 BMS Overview

2.1 Control Panels

A **B**uilding **M**anagement **S**ystem (**BMS**), consisting of Synapsys energy management interface devices monitor the relevant metering systems associated with Calder Park, Wakefield.

The name and location of the control panel is as follows:

1. EMCP – Adjacent to LV Switchboard in warehouse.

3 Time Zone Overview & Plant Operation

3.1 Time Zones

The energy management interface operates to monitor the associated metering systems on a 24/7 basis.

4 Operational Descriptions

4.1 Metering

The energy management interface monitors & logs the following utility meters:

4.1.1 Electric Meters (ModBus kWh)

Main LV Panel – LV01
- Incoming LV Meter – ELM01
- Ext DB/5 Feed LV Meter – ELM02
- Mechanical DB Feed LV Meter – ELM03
- Door & Dock Leveller BB1 Feed LV Meter – ELM04
- Door & Dock Leveller BB2 Feed LV Meter – ELM05
- Lift Feed LV Meter – ELM06
- Gatehouse L&P DB/GH Feed LV Meter – ELM07

External Lighting & Power Distribution Board – DB5
- Lighting LV Meter – ELM08
- Power LV Meter – ELM09

Warehouse Lighting & Power Distribution Board – DB6
- Lighting LV Meter – ELM10
- Power LV Meter – ELM11

Dock Tower Office Lighting & Power Distribution Board – DB7
- Lighting LV Meter – ELM12
- Power LV Meter – ELM13

Level 00 Office Lighting & Power Distribution Board – DB1
- Lighting LV Meter – ELM14
- Power LV Meter – ELM15

Level 01 Office Lighting & Power Distribution Board – DB2
- Lighting LV Meter – ELM16
- Power LV Meter – ELM17

Level 02 Office Lighting & Power Distribution Board – DB3

- Lighting LV Meter – ELM18
- Power LV Meter – ELM19

Readings are taken every 12 hours and plotted with daily, weekly and monthly cumulative totals also available for interrogation by the end user on the supervisor display panel.

4.1.2 Water Meters (MBus m^3)

- Boundary Water Meter (monitored via PadPuls interface) – WM01

Readings are taken every 12 hours and plotted with daily, weekly and monthly cumulative totals also available for interrogation by the end user on the supervisor display panel.

5 BMS Supervisor

The supervisor display panel is located on the front of the BMS control panel EMCP and utilises an easy to operate dashboard-based interface that requires the user to navigate to the desired location or item to interrogate for further information.

Navigation is integrated into the system to enable the user to move around the system with ease.

Information can be viewed, adjusted and monitored if the operator has the required level of access and credentials.

Plots or traces can be produced and saved or exported by the end user on request.

6 Control Panel Construction

6.1 Drawings

Control panel external layout and wiring drawings are produced using Microsoft Visio on A4 sized paper.
All control panel equipment is labelled with a dedicated reference.
All wire and terminal numbers are shown.

The control panel drawings are issued with drawing numbers that reference to the contract.

A full set of 'as manufactured' drawings are provided with the panel, housed in an internal drawing pocket.

6.2 Safety

Panels are constructed with components that meet IP20 standards to allow safe live testing with the door open.

All control circuits are 24VAC.

All phases, including incoming isolator terminals, are fully shrouded.

Terminals having live feeds from external equipment are shrouded and carry a warning label.

6.3 Enclosure

The control panel enclosure is designed to meet IP54 Protection Standards.

The control panel is manufactured to Form 1 type construction.
Each individual starter is covered by transparent plastic and fitted with an interlockable isolator.

Panel body and doors are of sufficient thickness (1.5 - 2.0mm) and braced to form a rigid structure.
Doors are braced as necessary to prevent flexing.
The equipment mounting plates are 2.5mm galvanised sheet steel and equipment mounting is by screws into tapped holes to enable replacements to be made from the front only.

Wall mounting panels do not exceed 1200mm in height.
Panels exceeding 1200mm in height are of the floor standing type.

Floor standing panels are manufactured and delivered to site as a single item.
Panels can be split into sections if required for site access at an additional cost.

Floor standing panels have provision for lifting eyes and for fixing to a concrete plinth.

All panel doors are lockable in the closed position and all locks use the same key.

The controls section door is not interlocked unless specified.

Natural or forced ventilation is provided to prevent the internal temperature exceeding a maximum of 40°C, if required.

6.4 Finishes and Labelling

Panels are finished in standard RAL7035 Grey.

Internal mounting plates are galvanised steel.

Panel fascia labels for plant control and indication are white traffolyte with black lettering.
Standard sizes for labels are 110mm wide by 140mm high or 220mm wide by 140mm high and cover the entire area taken up by the relevant equipment (e.g., switches and associated lamps).
All fascia labels are fixed with bright finish pan head screws.

Warning labels are yellow self-adhesive type with black lettering.

Internal labels are clear self-adhesive type with black lettering fitted to the grey trunking lids & white self-adhesive with black lettering fitted to panel components.

6.5 Wiring, Identification and Labelling

All internal panel wiring is in accordance with IET wiring regulations.

Power wiring is tri-rated (stranded) in phase colours with a minimum size of 2.5mm² up to and including 6.0mm².

Power wiring 10.0mm² and above is black cables with terminal sleeves in phase colours.
Control circuit wiring is kept physically separated from other circuits within the panel and is tri-rated cable (stranded), with a minimum size of 1.0mm².

The cable colour coding is as follows:

400VAC	Brown/Black/Grey/Blue
230VAC	Brown/Blue
24VAC	Red/Orange
12/24VDC	Violet
Controls cables (ELV)	White

Analogue signal cable has an overall screen of either braiding or foil and with PVC sheath.
Foil-screened cables contain a ‘drain wire’, running the entire length of the cable, which is used for terminating the screen.
Conductors are of the flexible (stranded) type and are individually sheathed in PVC.

Wiring is carried on the front surface of the mounting plate neatly strapped in suitably sized ventilated plastic cable trunking.

Cable and trunking sizes complies with the IET Wiring Regulations with regards to grouping, bunching and enclosing factors.

Wiring to movable doors is loomed and protected with spiral wrap.

Wiring outside the trunking or loom is neatly set for connection to terminals or equipment.

All control wires carry numbered ferrules at both ends.

Each incoming and outgoing cable is separately terminated with an approved crimped terminal to suit the terminal use.

Terminals for control wiring is of the IDC to screw type and sized depending on rating.

Terminals for power wiring is of the IDC to screw type and sized depending on rating.

Terminals for differing voltages and circuit types are segregated and labelled accordingly.

No more than two wires are connected to any one terminal.

Insulating barriers are fixed between adjacent terminals for power wiring to give adequate protection while allowing easy access to terminals.

6.6 Cable Entries

Removable gland plates are provided for terminating incoming cabling.
All plates are sealed against the ingress of dirt, dust and moister.

All entries for cables is easily accessible and marked to correspond with the panel-wiring diagram of external connections.

6.7 Controls Section

The controls section houses the DDC controllers and any power supplies, interface relays and terminals as detailed on the drawings.

An internal shrouded on/off switch is provided to allow isolation of the controls section.

The power supply to the controls section is taken from the live side of the main incoming isolator.

Controller input cables are screened, and a terminal is provided for each cables screen.
The cable from the incoming terminals to the controller is continue screened with the screens grounded to clean earth bars adjacent to the controllers

A 13A socket is provided within the controls section for supplying test equipment.
The socket is labelled “For computer use only”.

6.8 Panel Equipment

6.8.1 Isolators

Main isolating switches and fuse switches are capable of opening and closing on-load and are suitable for 50Hz three phase, four wire operation.

6.8.2 Miniature Circuit Breakers

All protective devices are Miniature Circuit Breakers.

MCBs are selected in accordance with manufacturers’ recommendations to suit the application.

The circuit breaker mechanism is of the current limiting type to ensure interruption of a fault current during the ‘rise’ of the first half cycle, thus limiting the let-through energy.

The operating mechanism is completely trip-free, and it is not possible to prevent the breaker tripping by holding or wedging the handle in the ‘ON’ position.

6.8.3 Contactors

Contactors are suitable for use on three phase, four wire 400/230V, 50Hz supplies and fitted with 24VAC coils, unless otherwise detailed.

6.8.4 Motor Overload Protection

Motor protection is provided by breakers with combined magnetic (short circuit) and thermal overload releases.
Also, protection against phase loss is provided by a differential trip.
The device is suitable for providing isolation and will accept a padlock.

Motor protection devices above 37.5kw are of the electronic type.

All motor protection devices are arranged for hand resetting.

6.8.5 Interlocking Relays

Plug-in type relays are interchangeable with equal numbers of 'N/O' and 'N/C' contacts.
Relays operating on different control voltages are grouped and labelled with coil voltage.

All relays have an integral status indication and manual override.

6.8.6 Switches

Control switches are of the rotary type, comprising a switch handle fixed to the panel fascia and the required number of contacts fitted to the rear of the bezel.

Control switches have black handles unless specified as key-operated and have a protection index of IP54.

6.8.7 Indicator Lamps

Indicator lamps are multi-cluster LED type and generally operate on 24vAC.
230vAC lamps are only be used for mains supply status indication.

Colours of lamp lenses are as detailed in BS EN 69973:

Green	-	Motor running
Red	-	Motor tripped, alarm
White	-	Power On, control circuit live
Amber	-	Flow fail, filter dirty
Blue	-	Frost active

The control panel is supplied with a lamp test push button.

6.9 Inspection & Testing

All control panels undergo a final inspection and test procedure.

Each control panel has its own unique control panel test certificate and serial number.

6.10 Despatch

Control panels are despatched with a set of 'as manufactured' drawings.

Control panels are despatched with a copy of the test certificate.

7 Appendix A - Plant Schematics

The relevant control panel schematics are appended to this document:

See Revision * attached.

Integrated Building Management Systems Ltd

Telephone: 01636 674 875
E-mail: controls@integratedbms.co.uk
Web: www.integratedbms.co.uk

Calder Park, Wakefield

Energy Monitoring Control Panel

4606/EMCP

HEAD OFFICE

Integrated Building Management Systems Ltd,
Brunel Drive,
Newark,
Notts,
NG24 2DE.

Tel: 01636 674 875
Fax: 01636 612 228
E-mail: controls@integratedbms.co.uk

IBMS Project Engineer

IBMS Engineer

PANEL DETAILS

Height (mm):	500 mm
Width (mm):	500 mm
Depth (mm):	210 mm
Approx Weight (kg):	20 kg
Mounting:	Wall Mounted
Eye Bolts Required:	N/A
Terminal Position:	Top
Isolator Position:	N/A - Switched Fused Spur
Panel Split Required:	N/A

SPECIAL INSTRUCTIONS

CLIENT

Carter Electrical Services Ltd,
Unit 6 North Staffs Business Park,
Innovation Way,
Stoke on Trent,
Staffordshire,
ST6 4BF.
Tel: 07875 931300,
Fax: ,
E-mail: ,

Clients Project Engineer

Simon Robinson

SITE ADDRESS

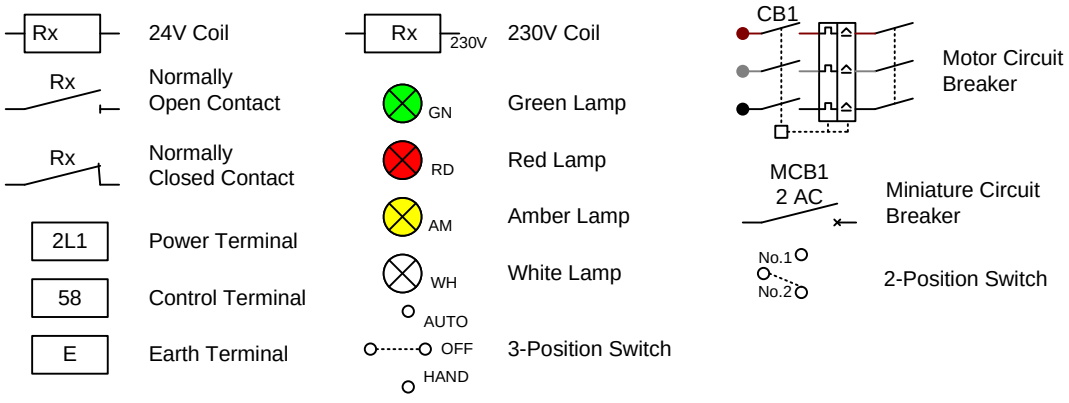
Calder Park,
Peel Avenue,
Wakefield,
WF2 7UA,
,
.
Tel: ,
Fax: ,
E-mail: ,

NOTES

These drawings are only a guide. Electrical installation works to be carried out to BS7671 and any other relevant specification / authority requirements.
Electrical contractor to identify each cable with numbers as detailed on wiring diagrams.

IF IN DOUBT - ASK

Symbol Key



Panel Information

400VAC L1:	Brown
400VAC L2:	Black
400VAC L3:	Grey
400VAC Neutral:	Blue
230VAC Live:	Brown
230VAC Neutral:	Blue
24VAC Live:	Red
24VAC Neutral:	Orange
24VDC +/-:	Purple

MCB Types:
Standard rated: Type ‘C’
Motor rated: Type ‘D’

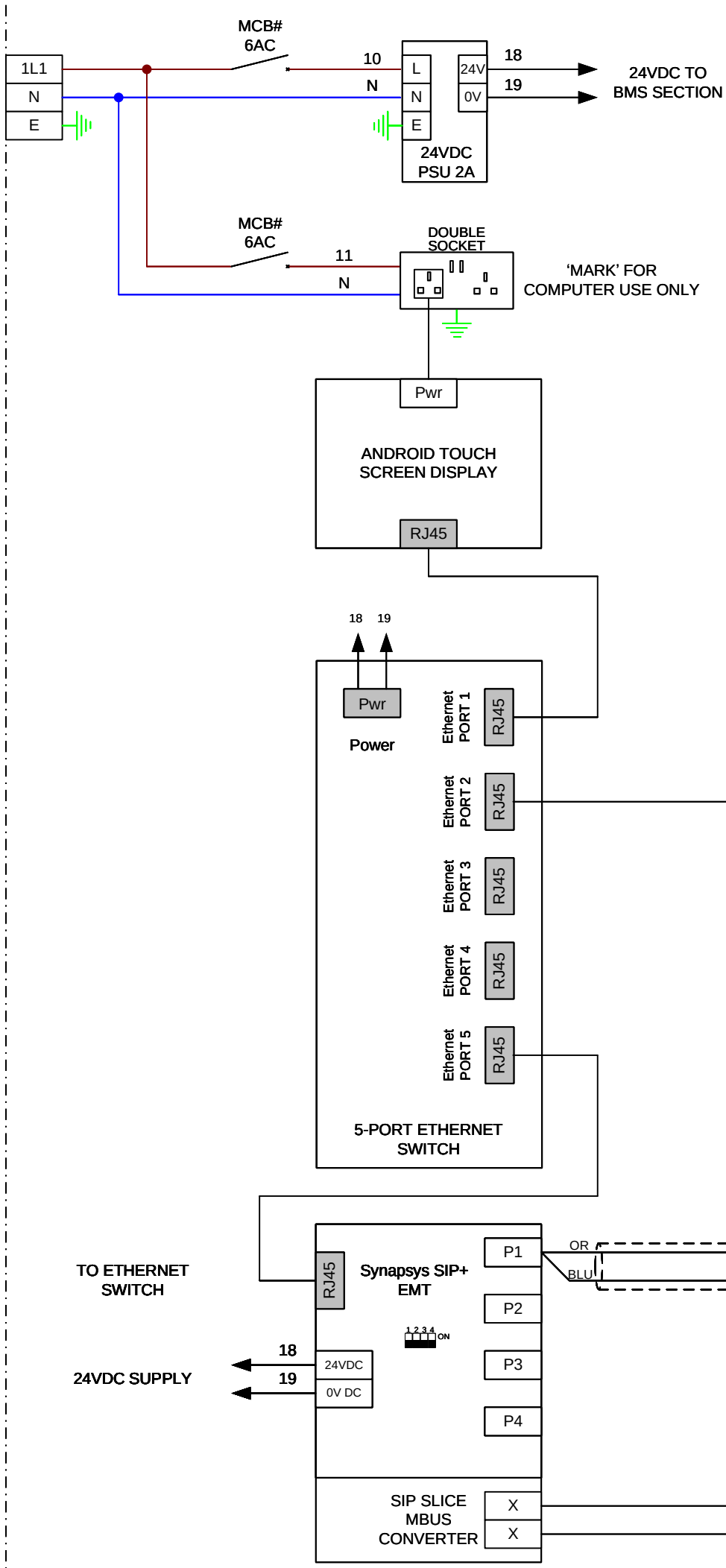
Cables Sizes:
Power: Minimum 2.5mm tri-rated
Control: Minimum 1mm tri-rated

DRAWING REVISION & HISTORY

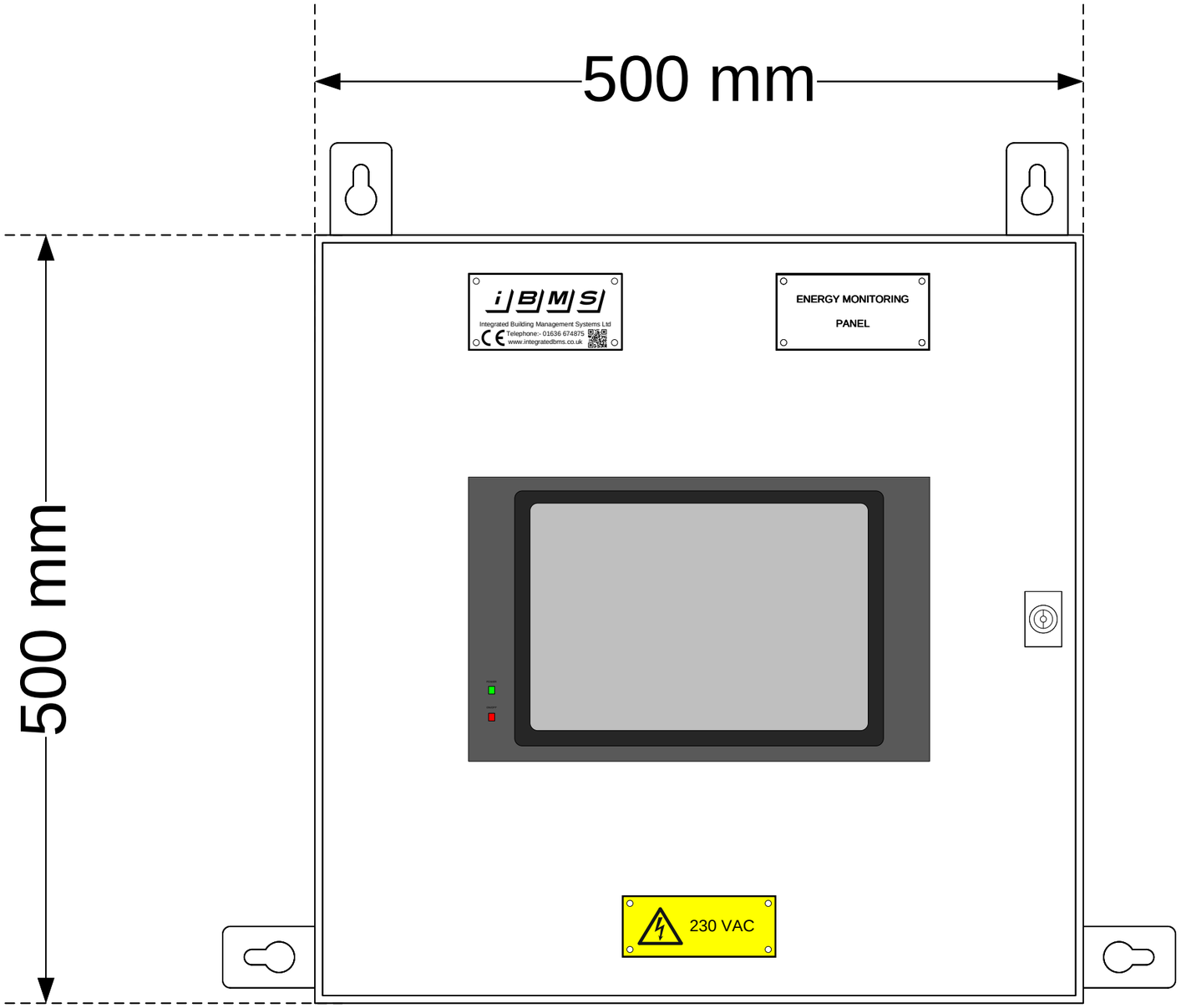
Rev	Date	Status	Change	Drn	Chk
A	08/04/22	For Approval	First drawing issue	DM	GS/ RH
B	14/04/22	As Manufactured	Updated from workshop	BB	GS/ RH
C					
D					
E					
F					
G					

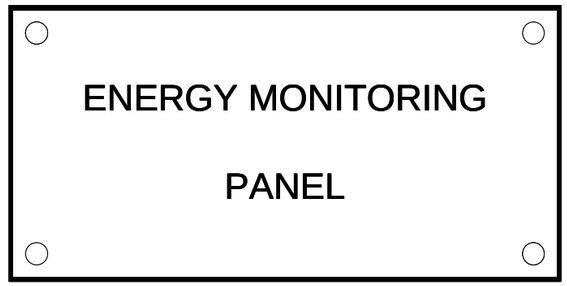
Rev	Date	Status	Change	Drn	Chk
H					
I					
J					
K					
L					
M					
X					

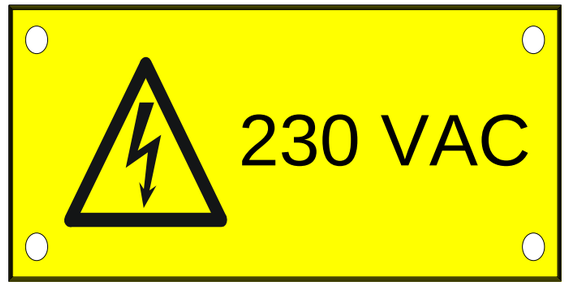
230VAC SUPPLY FROM LOCAL
13A SWITCHED FUSED SPUR



iBMS	Project:	Calder Park, Wakefield	Ref: 4606/EMCP	
	Title:	Energy Monitoring Control Panel	Date: 14/04/2022	Drawn: BB
	Client:	Carter Electrical Services Ltd	Sht 2 of 3	Rev: B







	Title:	Energy Monitoring Control Panel	Ref: 4606/EMCP	
	Project:	Calder Park, Wakefield	Date: 14/04/2022	Drawn: BB
	Client:	Carter Electrical Services Ltd	Sht 3 of 3	Rev: B

Form: MPF 5.6
Issue: C

Operations

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP
Project Name -	Calder Park, Wakefield

Client -	Carter Electrical Services
Supply Voltage -	230vAC
Full Load Current -	1.5AMP (Approx)
Locks Type -	(•) [/] Eldon AMLS 3530 [/] 2 Keys Sent with Panel ( ) [ ] Eldon AMLS 3230 [ ] Other Specify _____
Specified Other -	N/A
Date Of Test -	19-4-22
Control Panel Serial No -	EMCP

Test Engineer's Signature -	
External Witness Signature if Applicable -	N/A
Panel Despatched With As Manufactured Drawings Ref -	[/] YES [ ] NO

IBMS

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

Visual Tests	Inspection Result				Notes
PANEL SPECIFICATION BY -	☐	IBMS	☑	Client	
MOUNTING -	☑	Wall	☐	Floor	
ENVIRONMENT -	☑	Indoor	☐	Out Door	
FIXINGS -	☑	Passed	☐	Not Applicable	
COLOUR CHECK -	☑	Passed	☐	Not Applicable	
PAINT WORK CHECK -	☑	Passed	☐	Not Applicable	
DOOR CLOSING CHECK -	☑	Passed	☐	Not Applicable	
DOOR LOCKING CHECK -	☑	Passed	☐	Not Applicable	
IS THE PANEL IP RATING SUITABLE FOR THE ENVIRONMENT-	☑	Passed	☐	Not Applicable	
TERMINALS TOP OR BOTTOM -	☑	Top	☐	Bottom	
TERMINAL MARKINGS -	☑	Passed	☐	Not Applicable	
TERMINAL SEPARATOR PLATES FITTED IN CORRECT POSITION -	☑	Passed	☐	Not Applicable	
GLAND HOLES -	☐	Inserted	☑	Blank	
MAIN ISOLATOR POSITIONING -	☐	Passed	☑	Not Applicable	
MAIN ISOLATOR SIZE -	☐	Passed	☑	Not Applicable	
MAIN ISOLATOR DOOR INTERLOCK -	☐	Passed	☑	Not Applicable	
EXTERNAL LABEL POSITIONS -	☑	Passed	☐	Not Applicable	
EXTERNAL LABEL SPELLING -	☑	Passed	☐	Not Applicable	
EXTERNAL DANGER LABELS -	☑	Passed	☐	Not Applicable	
INTERNAL LABEL POSITIONS -	☑	Passed	☐	Not Applicable	
INTERNAL LABEL SPELLING -	☑	Passed	☐	Not Applicable	
INTERNAL DANGER LABELS -	☑	Passed	☐	Not Applicable	
INCOMING SUPPLY TERMINATION'S -	☑	Passed	☐	Not Applicable	
INCOMING EARTH TERMINATION -	☑	Passed	☐	Not Applicable	
GLAND PLATE & DOOR EARTHING -	☑	Passed	☐	Not Applicable	
SEGREGATION OF SUPPLIES -	☐	Passed	☑	Not Applicable	
TRUNKING SPACE FACTORS (MIN 25% FREE) -	☑	Passed	☐	Not Applicable	
POWER CONNECTIONS TORQUE TESTED & MARKED UP -	☑	Passed	☐	Not Applicable	

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

MOTOR STARTER SIZING -	☐ Passed	☑ Not Applicable	
MOTOR OVERLOAD SIZING -	☐ Passed	☑ Not Applicable	
MOTOR OVERLOAD SETTINGS -	☐ Passed	☑ Not Applicable	
CONTACTOR kW RATINGS -	☐ Passed	☑ Not Applicable	
MCB SIZING -	☑ Passed	☐ Not Applicable	
INVERTER SIZING -	☐ Passed	☑ Not Applicable	
SOFT-START SIZING -	☐ Passed	☑ Not Applicable	
CORRECT AIR GAP BETWEEN INVERTERS -	☐ Passed	☑ Not Applicable	
4 POLE RELAYS CHECKED FOR CORRECT COIL VOLTAGES -	☐ Passed	☑ Not Applicable	
SRM's CHECKED FOR CORRECT COIL VOLTAGES -	☐ Passed	☑ Not Applicable	
METALWORK EARTHED TO MAIN EARTH TERMINATION -	☑ Passed		
PANEL THERMOSTAT(S) SET -	☐ Passed	☑ Not Applicable	
L.E.D LENS COLOURS CHECKED -	☐ Passed	☑ Not Applicable	
GENERAL WIRE TIGHTNESS -	☑ Passed		
FREE LOOMING NEATNESS -	☑ Passed	☐ Not Applicable	
DOOR WIRING NEATNESS -	☑ Passed	☐ Not Applicable	
GENERAL ENCLOSURE NEATNESS -	☑ Passed		
PANEL CLEANED & HOVERED -	☑ Passed	☐ Not Applicable	

I/O Modules Settings	Inspection Result		Notes
CONTROLLER ADDRESSES CORRECT -	☐ Passed	☑ Not Applicable	
I/O MODULE ADDRESSES CORRECT -	☐ Passed	☑ Not Applicable	
DIX MODULE JUMPERS REMOVED FOR AUTO OPERATION -	☐ Passed	☑ Not Applicable	
RELAY OUTPUT MODULE JUMPERS SET (R/L OR H/L) -	☐ Passed	☑ Not Applicable	

Panel Photographs		Notes
INTERNAL -	☑ Yes	
EXTERNAL -	☑ Yes	
ARE THEY LEGIBLE -	☑ Yes	

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

Functionality Tests With Voltage Applied	Inspection Result		Notes
MAIN ISOLATOR -	☐ Passed	☑ Not Applicable	
MCB SUPPLIES -	☑ Passed	☐ Not Applicable	
PHASE FAILURE RELAY OPERATED -	☐ Passed	☑ Not Applicable	
MAINS TRANSFORMERS -	☑ Passed	☑ Not Applicable	
MAIN CONTROL CIRCUITS -	☑ Passed	☑ Not Applicable	
CONTROL TRANSFORMERS -	☑ Passed	☐ Not Applicable	
SUB CONTROL CIRCUITS -	☑ Passed	☐ Not Applicable	
FIRE ALARM INTERLOCK CIRCUIT -	☐ Passed	☑ Not Applicable	
FIREMANS SWITCH AUTO / OFF / EXTRACT -	☐ Passed	☑ Not Applicable	
GAS VALVE SAFETY CIRCUIT -	☐ Passed	☑ Not Applicable	
GAS DETECTION UNIT -	☐ Passed	☑ Not Applicable	
PRESSURISATION INTERLOCK CIRCUIT -	☐ Passed	☑ Not Applicable	
EXTERNAL INTERLOCK CIRCUITS -	☐ Passed	☑ Not Applicable	
MOTOR STARTERS OPERATION -	☐ Passed	☑ Not Applicable	
SOFT STARTERS OPERATION -	☐ Passed	☑ Not Applicable	
VOLTAGE CHECKED AT TERMINALS FOR SWITCHED SUPPLIES -	☐ Passed	☑ Not Applicable	
INVERTERS PROGRAMMED & OPERATED -	☐ Passed	☑ Not Applicable	
INVERTER INTERLOCKS -	☐ Passed	☑ Not Applicable	
TIMERS SET TO DOE / DODE ETC -	☐ Passed	☑ Not Applicable	
TIMERS RUN TIME SET -	☐ Passed	☑ Not Applicable	
PLANT ITEMS OPERATE IN AUTO MODE -	☐ Passed	☑ Not Applicable	
LAMP TEST OPERATION -	☐ Passed	☑ Not Applicable	
UPS OPERATED IN MAINS & BACK-UP MODE -	☐ Passed	☑ Not Applicable	
PANEL VENTILATION FANS DIRECTION -	☐ Passed	☑ Not Applicable	
BMS CONTROLLERS POWERED UP -	☐ Passed	☑ Not Applicable	
BMS INTER-CONTROLLER NETWORK -	☐ Passed	☑ Not Applicable	
SOFTWARE DOWNLOADED TO CONTROLLER(S) -	☐ Passed	☑ Not Applicable	

Form: MPF 5.6 Operations

Issue C

PANEL TEST RECORD

Project No -	4606
Panel Ref -	FMCP

Insulation Tests @ 1kV	Readings	Unit
INSULATION BROWN TO EARTH -	>999	MΩ
INSULATION BLACK TO EARTH -		MΩ
INSULATION GRAY TO EARTH -		MΩ
INSULATION BLUE TO EARTH -	>999	MΩ
INSULATION BROWN TO BLUE -	>999	MΩ
INSULATION BLACK TO BLUE -		MΩ
INSULATION GRAY TO BLUE -		MΩ
INSULATION BROWN TO BLACK -		MΩ
INSULATION BROWN TO GRAY -		MΩ
INSULATION BLACK TO GRAY -		MΩ

Flash Tests For 1 Minute @	Readings	Unit
LEAKAGE BROWN TO EARTH -	NA	MΩ
LEAKAGE BLACK TO EARTH -	- -	MΩ
LEAKAGE GRAY TO EARTH -	- -	MΩ
LEAKAGE BLUE TO EARTH -	- -	MΩ
LEAKAGE BROWN TO BLUE -	- -	MΩ
LEAKAGE BLACK TO BLUE -	- -	MΩ
LEAKAGE GRAY TO BLUE -	- -	MΩ
LEAKAGE BROWN TO BLACK -	- -	MΩ
LEAKAGE BROWN TO GRAY -	- -	MΩ
LEAKAGE BLACK TO GRAY -	- -	MΩ

Controller Series Description	Controller Serial Number

Form: MPF 5.6 Operations

Issue C

PANEL TEST RECORD

Project No -	4606
Panel Ref -	EMCP

Items Listed Below Are Not fitted at the Time of Despatch and Will Be Reported to the Project Engineer	
Quantity	Item
X1	SynaPSis SIP +
X1	MB48 SLICE

Place Holder

Declaration of Conformity

The Manufacturer of the Products covered by this Declaration is:

IBMS Ltd
Brunel Drive,
Newark,
NG24 2DE

The Directives covered by this Declaration:

2014/30/EU, Low Voltage Directive (LVD)
2014/30/EU, Electromagnetic Compatibility Directive (EMC)

The Products Covered by this Declaration

Product Name:	*EMCP/CALDER PARK WAKEFIELD*
Panel ref no:	*4606/ENERGY MONITORING CONTROL PANEL*

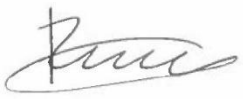
The Basis on which Conformity is being Declared

The manufacturer hereby declares under his sole responsibility that the products identified above comply with the protection requirements of the EMC directive and with the principal elements of the safety objectives of the Low Voltage Equipment directive, and that the following harmonised standards have been applied:

Standard ref	Title
BS EN 61439-1	*Low-voltage switchgear and control gear assemblies. General rules*
BS EN 61439-2	*Low-voltage switchgear and control gear assemblies. Power switchgear and control gear assemblies*

The technical documentation required to demonstrate that the products meet the requirements of the Low Voltage Equipment directive has been compiled and is available for inspection by the relevant enforcement authorities.

The CE mark was first applied in:

Signed: 

Authority: Project Manager

Date: 12/07/2022

CE

Attention!

The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives.

Details of these special measures and limitations to use are available on request,
and are also contained in the product manuals.

Components used in the assembly of the product are CE marked by the manufacturer's, details of which are available on request.

SYNAPSYS
BUILDING INTELLIGENCE

SIPslice M-Bus Converter

Overview

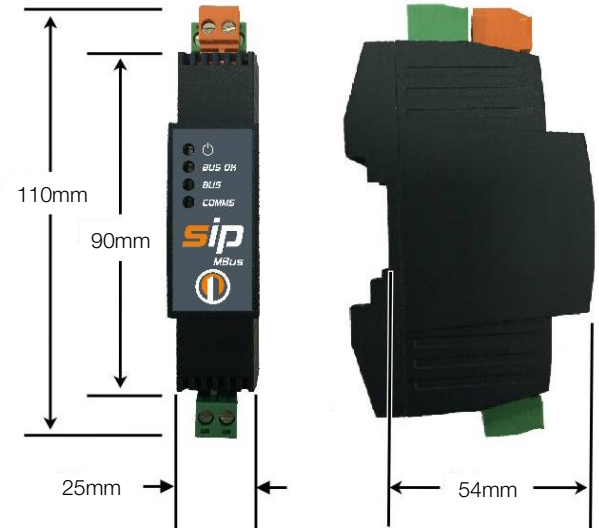
The Synapsys SIPslice M-Bus Level Converter has been developed to provide a simple and efficient way of interfacing third party M-Bus meters such as Heat, Gas, Water, Electricity or Pulse counters to an M-Bus master, for example our own SIPe M-Bus M-Logger, SIP M-Bus Trend interface, Trend XNC or other integration technologies.

Designed for receiving and transmitting data from multiple 1.5mA meter loads utilising the M-Bus protocol, the SIP M-Bus Level Converter is also resistant to sustained short circuit and is available for a wide power supply range.

SIPslice M-Bus converters have a small footprint with variants ranging from 3 to 250 slave devices, supporting M-Bus communications via both RS232 and RS485.

SIPslice M-Bus Level Converter features

- Available in 3, 20, 60, 120 or 250 unit load variants
- Small footprint
- LED's for power, Bus activity, Health and Comms
- Transmission rate 300 to 9600 Baud
- 1 x RS232 connection
- 1 x RS485 connection
- 1 x M-Bus protocol (M+ and M-)
- DIN rail mounting



At a glance

- Cost effective M-Bus level converter solution
- Simple to use and install
- Small footprint
- Available in 3 to 250 unit load variants
- Backed up by Synapsys technical support

Ordering

Synapsys offer a range of SIP slice products and to make it easier for you to select the correct product for your application we have created two sets of product codes for the SIP M-Bus slice products:

- One set of codes for connection to our SIP and any other third party master device
- Second set of codes for connection to our brand new SIP+ device

Just ensure you order the correct SIP slice for your application and the connectors you require will come free of charge.

SYNAPSYS
BUILDING INTELLIGENCE

Product codes

SIP Slice M-Bus products connecting to SIP or third party device

When connecting a SIP Slice M-Bus product to a SIP or a third party master device please ensure you order using the codes below.

Your SIP M-Bus slice will come with the following to enable connection:

- Power connector
- RS485 connector
- RS232 cable

Part No.	Description
SYN/MBUS/CONV/3	SIPslice M-Bus level converter for up to 3 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/20	SIPslice M-Bus level converter for up to 20 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/60	SIPslice M-Bus level converter for up to 60 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/120	SIPslice M-Bus level converter for up to 120 unit loads to be used with a SIP or a third party master device.
SYN/MBUS/CONV/250	SIPslice M-Bus level converter for up to 250 unit loads to be used with a SIP or a third party master device.

SIP Slice M-Bus products connecting to SIP+ devices

When connecting a SIP Slice M-Bus product to a SIP+ device please ensure you order using the codes below.

Your SIP M-Bus slice will come with the following to enable connection:

- DIN rail connector for communications and power via the CAN Bus from a SIP+ device

Part No.	Description
SYN+/MBUS/CONV/3	SIPslice M-Bus level converter for up to 3 unit loads to be used with a SIP+
SYN+/MBUS/CONV/20	SIPslice M-Bus level converter for up to 20 unit loads to be used with a SIP+
SYN+/MBUS/CONV/60	SIPslice M-Bus level converter for up to 60 unit loads to be used with a SIP+
SYN+/MBUS/CONV/120	SIPslice M-Bus level converter for up to 120 unit loads to be used with a SIP+
SYN+/MBUS/CONV/250	SIPslice M-Bus level converter for up to 250 unit loads to be used with a SIP+

For more information about Synapsys and our product range please visit www.synapsys-solutions.com.

Alternatively to speak with one of our team in more detail or to arrange a demonstration of our products and solutions, please contact us on 01444 246 128 and we will be happy to discuss your requirements.

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Synapsys Solutions Ltd
No. 1 Woodlands Court, Albert Drive,
Burgess Hill, West Sussex, RH15 9TN

T: 01444 246 128
E: enquiries@synapsys-solutions.com
W. www.synapsys-solutions.com

SYNAPSYS
BUILDING INTELLIGENCE

Vorex 10”/15” BMS Touch Display Unit, Panel Mount Manual

Environmental Considerations:

1.Operating Environment

Ambient temperature:-10℃-60℃

Ambient humidity: 40%-65%

Transport/storage temperature:-20℃-60℃

Transport/storage humidity: 35%-80%

2. Power Specifications

Rated voltage: AC100V-240V switch to DC12V

Rated frequency: 50Hz-60Hz

Rated current:3/5A

Do not place the PC on an unstable place.

Avoid all in one PC to heat sources.

Working power is AC 100V-240V switch to DC12V.

Avoid contact or expose to inappropriate temperatures, solvents, acid, water or moisture.

Avoid the fragmentation, corrosion and any other damage to products or components (Such As Shell, LCD/LED panel, port, circuits etc.)

Screen protection is supplied please leave this is place until the project is handed over, the screen will still operate touch trough the screen saver.

10.1” All Metal Android BMS Touch Screen

Size	**10.1" Android touch screen Panel PC**
Panel Type	Industrial LCD panel A+ grade
Aspect Ratio	16:9
Resolution	1366*768
Contrast	800:1
Luminance	**300nit**
Response time	5ms
Active Area (mm)	227(W)*131(H)
Display colours	16.7M(8-bit)
Configuration -CPU	**A83T SOC Octa-core ARM Cortex-A7 2.0Ghz**
	8G EMMC
Built in	**Wi-Fi/Bluetooth**
OS	**Android 4.4 may vary**
Touch type	**Capacitive touch-10 points**
I/O Ports	1*12V Power Adapter ,2*USB,1*SD card slot,1*HDMI
	1*RJ-45 network interface
	1*Audio I/O interface
	1*COM IO May vary
Language	Chinese, English, French, German, Italian, Japanese, Korean, Russian, Spanish etc.
Certificate of Approval	CE, FCC, RoHS, ISO
Installation	**VESA(100x100)without stand**/Embedded/Wall Mount/ Desktop
Colour	Black
Material	Aluminium Alloy
Addition*	**External sleep and wake button**

*Some 10.1” screens are fitted with an external sleep/wake button this can be mounted external on the panel door, only use the top mount USB socket, it is marked with a red edged label

15” All Metal Android BMS Touch Screen

Size	**15" Android touch screen Panel PC**
Panel Type	Industrial LCD panel A+ grade
Aspect Ratio	4:3
Resolution	1024*768
Contrast	1000:1
Luminance	**350nit**
Response time	5ms
Active Area (mm)	304.1(W)*228.1(H)
Display colours	16.7M(8-bit)
Configuration -CPU	**A83T SOC Octa-core ARM Cortex-A7 2.0Ghz**
	8G EMMC
Built in	**Wi-Fi/Bluetooth**
OS	**Android 4.4 may vary**
Touch type	**Capacitive touch-10 points**
I/O Ports	1*12V Power Adapter ,2*USB,1*SD card slot,1*HDMI
	1*RJ-45 network interface
	1*Audio I/O interface
	1*COM IO may vary
Language	Chinese, English, French, German, Italian, Japanese, Korean, Russian, Spanish etc.
Certificate of Approval	CE, FCC, RoHS, ISO
Installation	**VESA(100x100)without stand**/Embedded/Wall Mount/ Desktop
colour	Black /Silver
Material	Aluminium Alloy

Setting Up

You will find a VOREX blue banner app on the desk top. If you press it will go and find the target IP address we have set on test. This is usually 192.168.10.11, but it may vary, however only slightly (this will depend on which testing rig controller- Tridium, EASYIO, ISMA- used at the time the screen was tested and the app was added).

The Vorex app will run each time the screen is powered up it will always go and look for the target controller. The boot up time may vary slight, but this is around 45 seconds.

If you want to change the target IP address, put all five fingers on the screen and a URL box will pop up, fill it in and update it.

If you want to change the screen address you will need to go into SETTINGS (looks like a gear)

it is in the list off app on the main page, then MORE, ETHERNET, FIXED IP, again the settings menu may vary slightly based on the Android version installed, some versions auto save your setting other need a tick box to be saved. This will be in the top right corner of the fixed IP address screen.

Factory default settings:

192.168.10.20 screen address

192.168.10.1

255.255.255.0

8.8.8.8

8.8.4.4

Tony Hughes: vorex.consultancy@btinternet.com

077732 18678

Website: https://vorexconsultancy.com

Please note metal casings may vary slightly, however the PCB motherboard and the screen components are all the same.

Don’t Forget

Five fingers on the screen with allow you to set the target IP address and the screen will store the target.

Some screens are fitted with external push button which puts the screen to sleep and wakes it up. Drill a suitable hole near to the edge or the screen and in range of the USB port cable supplied and fit the button; only use the USB at the top of and to the rear of screen, marked with a silver label.

NOTE:

Running the screen on EASYIO you should have no real issues, if you have issues running N4 controllers with pop ups and icons try using default Hx , instead of HTML5 in your default and user setups

Port

COM：COM RS232，Optional RS422/485
USB：USB 2.0, Optional USB 3.0

8 inch-12 inch

Metal casing and outer trim design may vary slightly , but the internal parts are the same.

PULSE SPLITTERS

Our LPS range of Pulse Splitters do not require batteries. They provide a low cost solution for multiple logging from a single source. Our 2-way and 3-way splitters are enclosed to prevent damage from submersion. We also provide the option of a DIN rail mounted splitter for single channel input versions.

Our standard splitters are provided with bare ends, but can be terminated to suit customers requirements. We also provide the option of terminating the input with a meter specific reed switch. Input and output cables are approximately 1 meter in length.

PRODUCT	Input Channels	Number of Outputs	Enclosure type
LPS12	1	2	Fully potted box
LPS13	1	3	Fully potted box
LPS32	3	2	Fully potted box
LPS13-DIN	1	3	DIN RAIL MOUNTED

Cable Terminations

Depending on the customer requirements, cables can be terminated to suit various meters, data loggers and data acquisition systems.

We supply a large selection of connectors including, Souriau and MIL spec.

Place Holder

Industrial Ethernet Switches
Overview

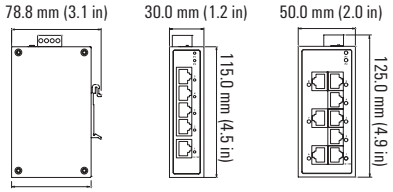
Unmanaged Switches
Adaptable and universal

Switches are the basic coupling elements in Ethernet networks. They connect the Ethernet participants together. In an Ethernet network the communication basically originates from the participants. The switches connect the participants together and enable the communication. Unmanaged switches are the simplest active network component. They do not need to be configured and are therefore very flexible. They use the basic standard protocols, such as auto-negotiation, auto-crossing, and flow-control and can automatically adjust to the different transmission speeds or connector wiring.

Unmanaged switches are protocol transparent. Each port on the switch creates an individual collision domain. The use of twisted-pair cabling with an RJ45 interface or fibre-optic cable based on the IEEE 802.3 specification interfaces are supported by all Weidmüller switches.

Unmanaged Fast Ethernet Switches

- 10/100BaseT(X) (RJ45 connector), 100BaseFX (multi/singlemode, SC or ST connector)
- Redundant dual 12/24/48 V DC, 18 to 30 V AC power inputs
- IP 30 aluminum housing
- Rugged hardware design well suited for hazardous locations (Class I Div. 2 /ATEX) and maritime environments (DNV/GL)
- –40 °C to 75 °C operating temperature range (T models)



Technical data

Technology		
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT (X) and 100BaseFX IEEE 802.3x for Flow Control	
Processing Type	Store and Forward	
Flow Control	IEEE 802.3x flow control, back pressure flow control	
Switch Properties		
MAC Table Size	1 K	
Packet Buffer Size	512 KBit	
Interface		
Fibre Ports	100BaseFX ports (SC/ST connector, multimode, singlemode)	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection	
DIP Switches	Enable/Disable broadcast storm protection	
LED Indicators	Power, 10/100M (TP port), 100M (fibre port)	
Optical Fibre		
	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. Transmit power	-10 dBm	0 dBm
Min. Transmit power	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)	40 km (9/125 µm singlemode cable)
Saturation	-6 dBm	-3 dBm
Power Requirements		
Input Voltage	12/24/48 V DC (9.6 to 60 V DC), 18 to 30 V AC (47 to 63 Hz), redundant dual inputs	
Input Current	IE SW BL05 5TX: 0.1 A @ 24 V IE SW BL05 1SC/1ST/1SCS: 0.11 A @ 24 V IE SW BL08 8TX: 0.13 A @ 24 V IE SW BL08 2SC/2ST/2SCS: 0.22 A @ 24 V IE SW BL08 1SC/1ST/1SCS: 0.17 A @ 24 V	
Overload Current Protection	1.1 A	
Connection	1 removable 4-contact terminal block	
Reverse Polarity Protection	Present	
Physical Characteristics		
Housing	Aluminum, IP 30 protection	
Dimensions (W x H x D)	IIE-SW-BL05-Series: 30 x 115 x 70 mm (1.18 x 4.52 x 2.76 in) IE-SW-BL08-Series: 50 x 115 x 70 mm (1.96 x 4.52 x 2.76 in)	
Weight	IE-SW-BL05-5TX: 175 g IE-SW-BL08-8TX: 275 g	
Installation	DIN-Rail mounting	
Environmental Limits		
Operating Temperature	Standard Models: -10 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)	
Storage Temperature	-40 to 85 °C (-40 to 185 °F)	

Environmental Limits	
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-11
Maritime	DNV, GL (not for 1412110000, 1412120000, 1412070000, 1412080000, 1412090000, 1412100000)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (meantime between failures)	
Time	IE-SW-BL05-Series: 3,040,784 hrs IE-SW-BL08-Series: 2,428,212 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

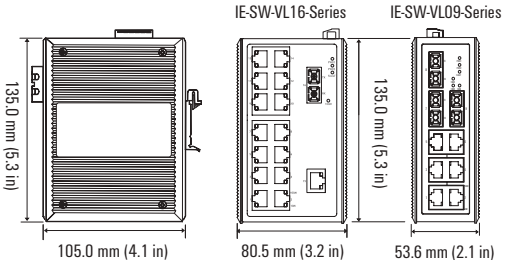
Port Variants	Model Type	Operating Temperature	Order No.
5 * RJ45	IE-SW-BL05-5TX	-10 to +60 °C	1240840000
	IE-SW-BL05T-5TX	-40 to +75 °C	1240850000
4 * RJ45, 1 * SC-Multimode	IE-SW-BL05-4TX-1SC	-10 to +60 °C	1240890000
	IE-SW-BL05T-4TX-1SC	-40 to +75 °C	1286550000
4 * RJ45, 1 * ST-Multimode	IE-SW-BL05-4TX-1ST	-10 to +60 °C	1240880000
	IE-SW-BL05T-4TX-1ST	-40 to +75 °C	1286540000
4 * RJ45, 1 * SC-Singlemode	IE-SW-BL05-4TX-1SCS	-10 to +60 °C	1240870000
	IE-SW-BL05T-4TX-1SCS	-40 to +75 °C	1286530000
8 * RJ45	IE-SW-BL08-8TX	-10 to +60 °C	1240900000
	IE-SW-BL08T-8TX	-40 to +75 °C	1286560000
6 * RJ45, 2 * SC-Multimode	IE-SW-BL08-6TX-2SC	-10 to +60 °C	1240910000
	IE-SW-BL08T-6TX-2SC	-40 to +75 °C	1240920000
6 * RJ45, 2 * ST-Multimode	IE-SW-BL08-6TX-2ST	-10 to +60 °C	1240930000
	IE-SW-BL08T-6TX-2ST	-40 to +75 °C	1286570000
6 * RJ45, 2 * SC-Singlemode	IE-SW-BL08-6TX-2SCS	-10 to +60 °C	1412110000
	IE-SW-BL08T-6TX-2SCS	-40 to +75 °C	1412120000
7 * RJ45, 1 * SC-Multimode	IE-SW-BL08-7TX-1SC	-10 to +60 °C	1412070000
	IE-SW-BL08T-7TX-1SC	-40 to +75 °C	1412080000
7 * RJ45, 1 * ST-Multimode	IE-SW-BL08-7TX-1ST	-10 to +60 °C	1412090000
	IE-SW-BL08T-7TX-1ST	-40 to +75 °C	1412100000
7 * RJ45, 1 * SC-Singlemode	IE-SW-BL08-7TX-1SCS	-10 to +60 °C	1240950000
	IE-SW-BL08T-7TX-1SCS	-40 to +75 °C	1286580000

Accessories

	Model Type	Order No.
19" Rack Mounting Kit	RM-KIT	1241440000
Cable fixing kit	IE-CFK-05	1339610000

Unmanaged Fast Ethernet Switches

- Redundant dual 24 V DC power inputs
- Relay output warning for power failure and port break alarm
- Broadcast storm protection
- Transparent transmission of VLAN tagged packets
- –40 °C to 75 °C operating temperature range (T models)



Technical data

Technology	
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Switch Properties	
MAC Table Size	1 K (IE-SW-VL09...Series), 4 K (IE-SW-VL16...Series)
Packet Buffer Size	512 Kbit (IE-SW-VL09...Series), 1.25 MBit (IE-SW-VL16...Series)
Interface	
Fibre Ports	100BaseFX ports (SC/ST connector)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches	Port fault alarm Enable/disable broadcast storm protection
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP port), 100M (fibre port)
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC
Optical Fibre	
	100BaseFX
	multimode
Wavelength	1300 nm
Max. TX	-10 dBm
Min. TX	-20 dBm
RX Sensitivity	-32 dBm
Link Budget	12 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)
Saturation	-6 dBm
Power Requirements	
Input Voltage	IE-SW-VL09: 24 V DC (12 to 45 V DC), redundant dual inputs IE-SW-VL16: 12/24/48 V DC (9.6 to 60 V DC), redundant dual inputs
Input Current	IE-SW-VL09T-6TX-3SC: 0.31 A @ 24 V IE-SW-VL16-16TX: 0.27 A @ 24 V IE-SW-VL16 SC/ST: 0.44 A @ 24 V
Overload Current Protection	1.6 A
Connection	1 removable 6-pin terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	IE-SW-VL09...Series: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in) IE-SW-VL16...Series: 80.5 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)
Weight	IE-SW-VL09: 790 g IE-SW-VL16: 1140 g

Physical Characteristics	
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1 CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3;
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	IE-SW-VL09...Series: 396,000 hrs IE-SW-VL16...Series: 257,000 hrs
Database	MIL-HDBK-217F, GB 25 °C
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
16 * RJ45	IE-SW-VL16-16TX	0 to +60 °C	1241000000
	IE-SW-VL16T-16TX	-40 to +75 °C	1286590000
6 * RJ45, 3 * SC-Multimode	IE-SW-VL09T-6TX-3SC	-40 to +75 °C	1240980000
14 * RJ45, 2 * SC-Multimode	IE-SW-VL16-14TX-2SC	0 to +60 °C	1241030000
	IE-SW-VL16T-14TX-2SC	-40 to +75 °C	1286610000
14 * RJ45, 2 * ST-Multimode	IE-SW-VL16-14TX-2ST	0 to +60 °C	1241050000
	IE-SW-VL16T-14TX-2ST	-40 to +75 °C	1286620000

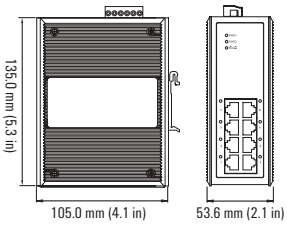
Accessories

	Model Type	Order No.
19" Rack Mounting Kit	RM-KIT	1241440000

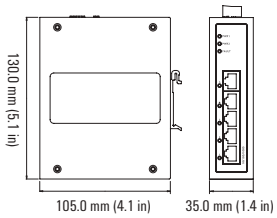
Unmanaged Gigabit Ethernet Switches

- Full Gigabit Ethernet on all ports
- Variants with slots for Gigabit SFP transceivers
- Redundant dual 12/24/48 V DC power inputs
- Relay output warning for power failure and port break alarm
- Broadcast storm protection
- Supports jumbo frame transmission (up to 9.6 KB)

IE-SW-VL08-xGT-Series



IE-SW-BL05GT-Series



Technical data

Technology	
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3ab for 1000BaseT(X) IEEE 802.3z for 1000BaseX IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Switch Properties	
MAC Table Size	8 K
Packet Buffer Size	1088 KBit (IE-SW-BL05-5GT), 1408 KBit (IE-SW-VL08-xGT)
Jumbo frame support	up to 9.6 KB
Interface	
Fibre Ports	100/1000BaseSFP slot (only IE-SW-VL08-6GT-2GS)
RJ45 Ports	10/100/1000BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches	Port fault alarm Enable/disable broadcast storm protection Enable/disable jumbo frame support
LED Indicators	PWR1, PWR2, FAULT, 10/100/1000M
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC
Power Requirements	
Input Voltage	12/24/48 V DC (9.6 to 60 V DC), redundant dual inputs
Input Current	IE-SW-BL05-5GT: 0.20 A @ 24 V IE-SW-VL08-8GT: 0.32 A @ 24 V IE-SW-VL08-6GT-2GS: 0.34 A @ 24 V
Connection	1 removable 6-contact terminal block
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	IE-SW-BL05-5GT: 35 x 130 x 105 mm (1.37 x 5.12 x 4.13 in) IE-SW-VL08-xGT: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	IE-SW-BL05-5GT: 290 g IE-SW-VL08-8GT 630 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F) (on request)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A

Regulatory Approvals	
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	478.000 hrs (Serie IE-SW-BL05-5GT) 325.000 hrs (Serie IE-SW-VL08-XGT)
Database	Telcordia (Bellcore), GB (IE-SW-VL08-xGT series)
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
5 * RJ45 10/100/1000BaseT(X)	IE-SW-BL05-5GT	0 to 60 °C	**1241250000**
	IE-SW-BL05T-5GT	-40 to +75 °C	**1286850000**
8 * RJ45 10/100/1000BaseT(X)	IE-SW-VL08-8GT	0 to +60 °C	**1241270000**
	IE-SW-VL08T-8GT	-40 to +75 °C	**1286860000**
6 * RJ45 10/100/1000BaseT(X), 2 Combo Ports (10/100/1000 BaseT(X) or 100/1000BaseSFP)	IE-SW-VL08-6GT-2GS	0 to +60 °C	**1241280000**
	IE-SW-VL08T-6GT-2GS	-40 to +75 °C	**1286870000**

Accessories

	Model Type	Order No.
19" Rack Mounting Kit	RM-KIT	**1241440000**

Note

The IE-SW-VL08-6GT-2GS supports up to 2 100/1000Base SFP slots. Corresponding SFP modules for Fast/Gigabit Ethernet, see page F.6.

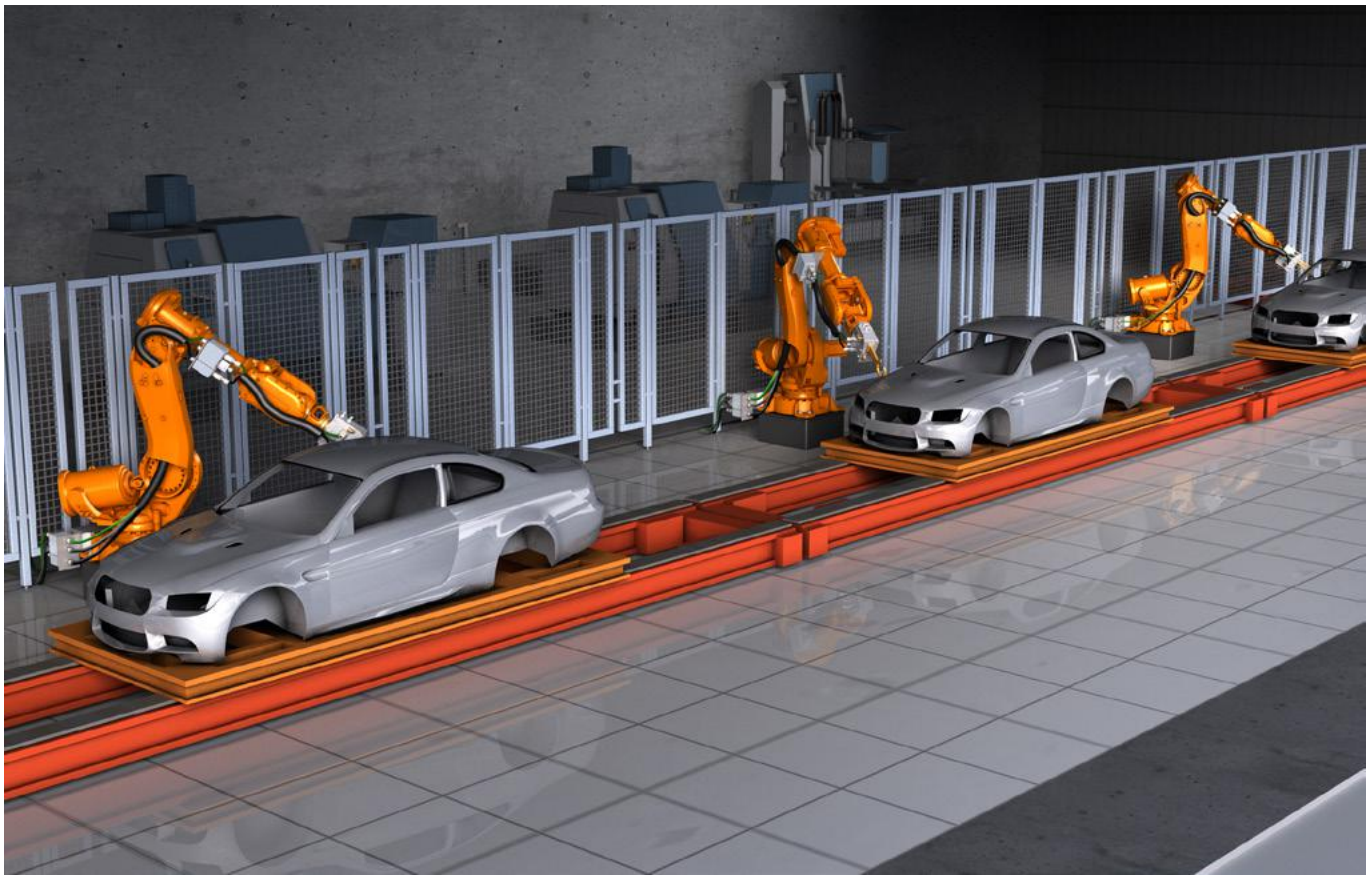
Managed Switches

Configurable according to requirements

Managed switches offer extensive control mechanisms for data distribution and bandwidth management to co-ordinate and cope with the different requirements of communication participants in an industrial network. Configuration is either web-based using a simple and intuitive user interface or via a serial console.

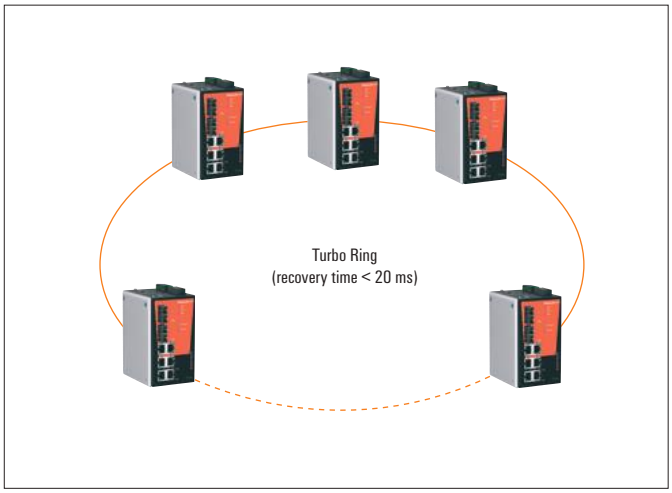
Powerful and reliable network redundancy

It is particularly important to have network redundancy to ensure system availability in today's Industrial Ethernet infrastructures. This is because in a highly integrated system, a connection error can lead to machine stoppage and thus to production losses. To minimise such risks in a managed Ethernet network, Weidmüller has integrated high-performance redundancy mechanisms into its managed switches. This is in addition to the RSTP/STP standard and port-trunking.



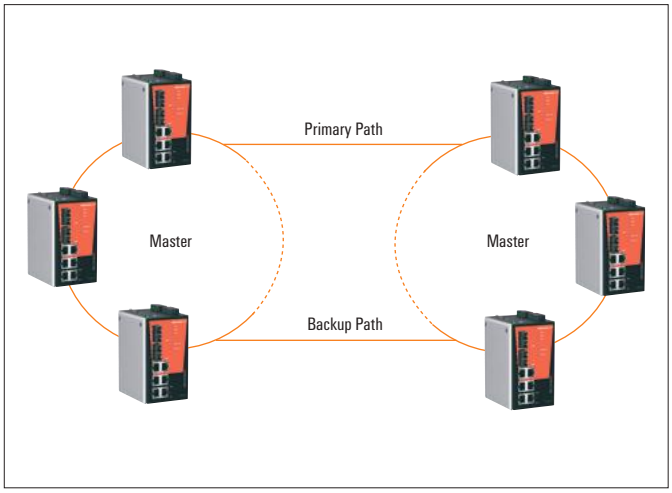
Ring redundancy

The Turbo-Ring technology integrated into Weidmüller's switches allows you to restore a network connection in case of failure in under 20 ms, and this with up to 250 switches in a ring. Turbo-Ring offers thee different topology options (Ring-Coupling, Dual-Ring and Dual-Homing) for different application requirements to ensure the maximum possible availability of industrial network applications.



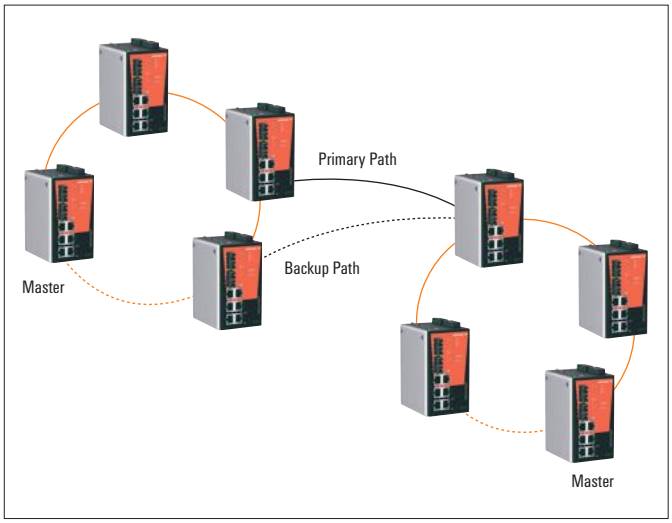
Ring-Coupling

In some applications, it is not sensible to have all equipment and devices in a single large redundant ring networked together, as some of the devices may be located in remote parts of the plant. For such structures, Ring-Coupling is ideal. It connects devices in multiple, smaller rings that are connected redundantly and directly with one another.



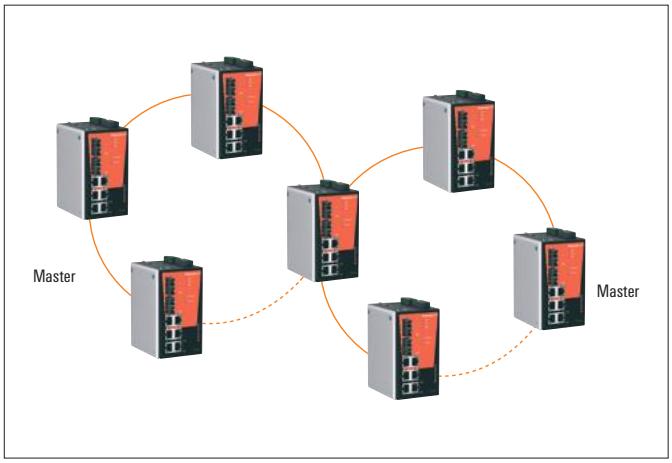
Dual-Homing

With Dual-Homing, two separate rings are connected through one managed switch via two independent connection points. The back-up connection is activated if the primary connection fails.



Dual-Ring

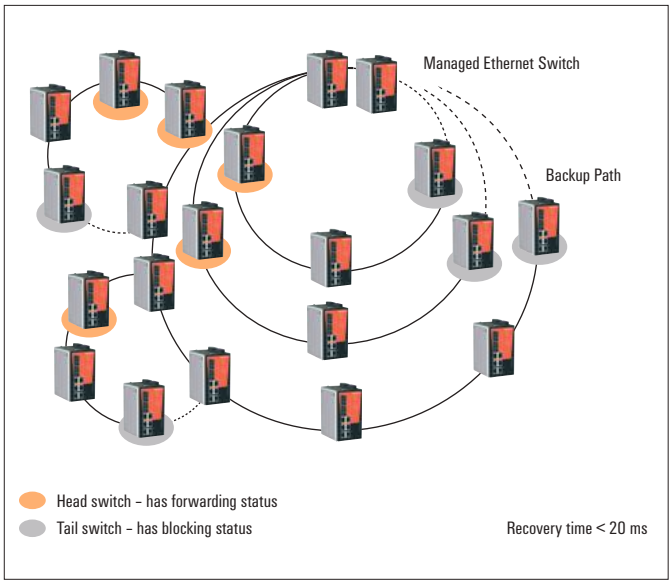
In a Dual-Ring, two neighbouring rings are connected with one another using one switch, without the need for additional ports or cabling. This configuration reduces the total number of ports and saves cabling costs, as an additional primary and back-up line is not needed.



Turbo-Chain

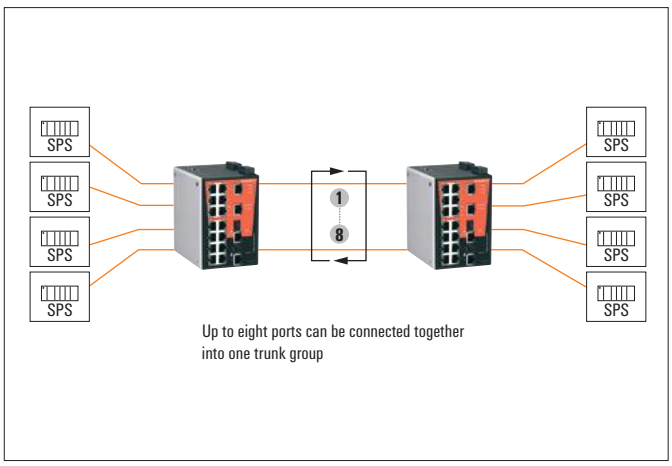
Turbo-Chain offers the possibility of creating multiple redundant networks without the limitations of ring technology. Turbo-Chain can be simply configured by defining two end-points in a segment. This means you can connect or extend existing redundant networks. When compared with traditional ring coupling or a network re-design, Turbo-Chain is more flexible as well as being more cost efficient and it has significant savings potential when compared to the effort for network restructuring and re-cabling. In addition Turbo Chain also supports IEEE 802.1w/D RSTP and STP protocols.

- Flexible network topology
- Unlimited and simple network expansion
- Quick troubleshooting (recovery time < 20 ms)
- Cost-effective configurations



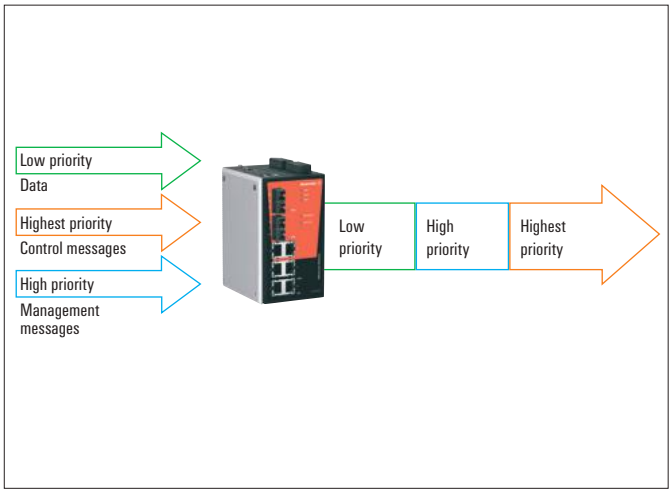
Port trunking for flexible connections

IEEE 802.3ad (LACP, Link Aggregation Control Protocol) permits flexible network connections and a redundant path for critical applications. It provides the means for a user to link via a higher bandwidth over the PremiumLine managed switches by combining more ports into a trunk group.



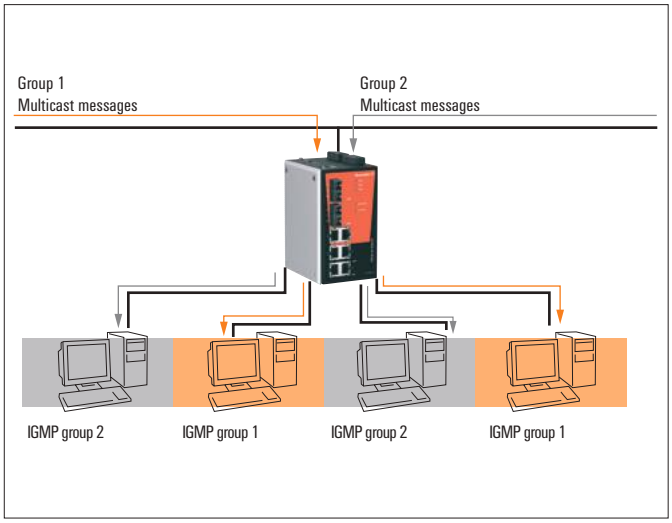
QoS supports real-time capability

Quality of Service (QoS) enables the possibility of prioritisation of data traffic in a network and ensures that important data is consistently available. Weidmüller managed switches can deal with IEEE 802.1p/1Q layer 2 CoS tags and also layer 3 TOS information. The QoS functionality of Weidmüller's managed switches improves network performance and ensures that time-critical applications are given priority.



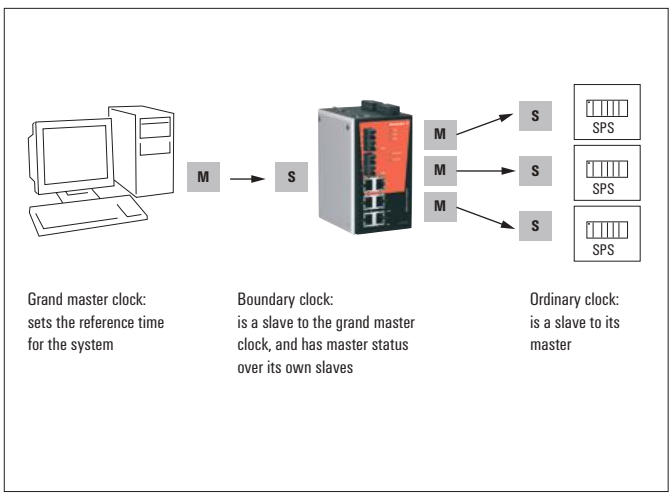
IGMP snooping and GMRP for filtering multicast data traffic

Weidmüller managed switches support GMRP (Generic Multicast Registration Protocol) and IGMP snooping. These protocols limit multicast data traffic so that it is only forwarded to the devices that actually require it. This reduces unnecessary network data traffic.



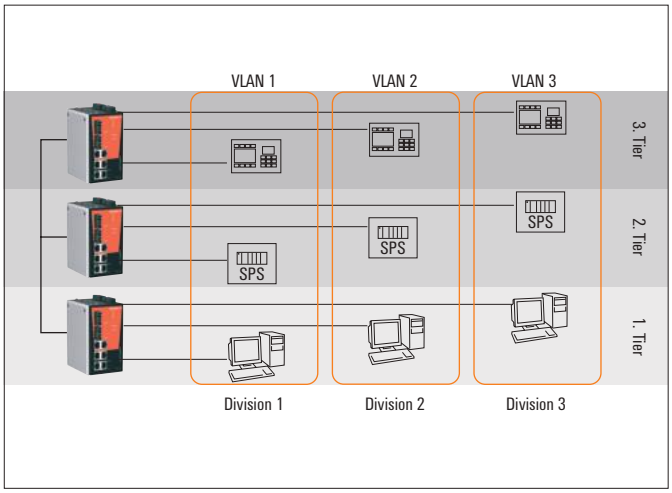
IEEE 1588 PTP - improves time synchronisation of automation devices

IEEE 1588 PTP, also known as Precision Time Protocol (PTP), was developed to synchronise real-time clocks which are located at specific nodes of a distributed system. Weidmüller managed switches with IEEE 1588 PTP are particularly suited for motion control applications where distributed clocks must be synchronised with high levels of accuracy.



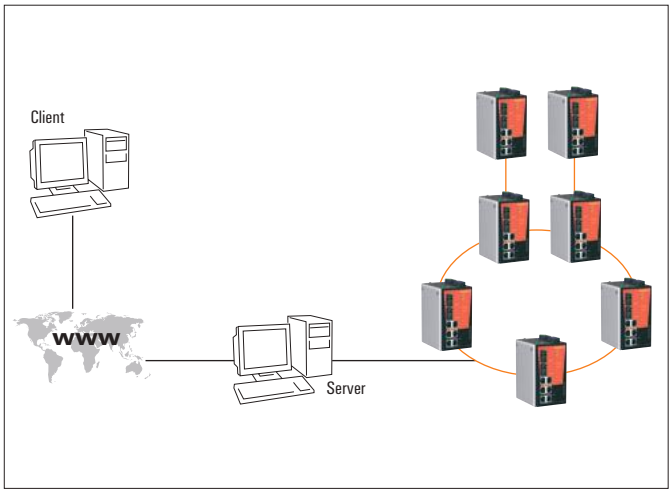
VLAN – simplifies network planning

VLAN stands for virtual LAN. It is a network structure with all the characteristics of a normal LAN, but not geographically constrained. A network can be divided into different sections using the VLAN function. It is possible, for example, to group servers or workstations together, based on their function. Data will only then be sent to Ethernet devices of a specific VLAN group. The option for isolating VLANs completely from one another serves to increase the security of data transfer and offers additional protection from unauthorised access or unauthorised data traffic.



Automatic topology detection using LLDP

The Link Layer Discovery Protocol (LLDP - IEEE 802.1AB) is a data link layer protocol which publishes information about a device containing its IP address, description and functional information to its neighbouring devices over the network. All of Weidmüller's managed switches fully support LLDP.

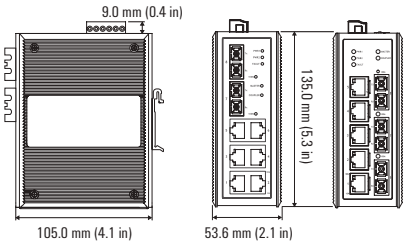


Simple browser based configuration

Weidmüller's managed switches can be easily configured using a web browser, telnet console or the Weidmüller switch configuration utility. Further switch configurations can be saved or the firmware updated using this user-friendly tool.

Managed Entry-level Ethernet Switches

- Turbo Ring and Turbo Chain with fast recovery time (<20 ms @ 250 switches)
- IGMP snooping, QoS, port- and tag-based VLAN
- Configurable error messages via SNMP trap, e-mail or relay output
- User-friendly, web-based configuration and management
- External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT(X) and 100BaseFX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1Q for VLAN Tagging	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ Telnet ▪ Syslog ▪ DHCP Option 66/67/82 ▪ BootP ▪ LLDP ▪ Modbus/TCP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-like MIB ▪ P-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
Fibre Ports	100BaseFX ports (SC/ST connector)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC

Optical Fibre	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a]	40 km [c]
	4 km [b]	
Saturation	-6 dBm	-3 dBm

[a] 50/125 µm, 800 MHz*km fibre optic cable
[b] 62.5/125 µm, 500 MHz*km fibre optic cable
[c] 9/125 µm singlemode fibre optic cable

Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-VL08M-8TX: 0.26 A @ 24 V IE-SW-VL08M-6TX-2ST/SC: 0.35 A @ 24 V IE-SW-VL08M-5TX-3SC: 0.32 A @ 24 V
Overload Current Protection	Present
Connection	1 removable 6-contact terminal block
Reverse Polarity Protection	Present

Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	IE-SW-VL08MT-...8TX/6TX-2SC/6TX-2ST/6TX-2SCS: 650 g IE-SW-VL08MT-...5TX/3SC/5TX-1SC-2SCS: 890 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	-40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC (not for 1345240000)
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Maritime	DNV, GL (not 1345240000 and 1344770000)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	1,102,845 hrs (IE-SW-VL08MT-6TX/8TX devices) 363,000 hrs (IE-SW-VL08MT-5TX devices)
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

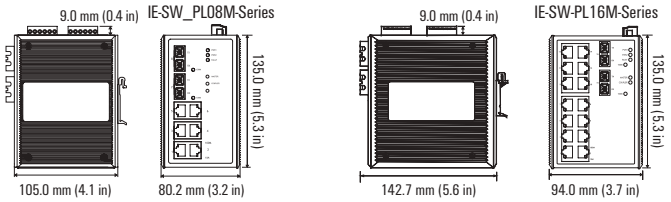
Port Variants	Model Type	Operating Temperature	Order No.
8 * RJ45	IE-SW-VL08MT-8TX	-40 to +75 °C	**1240940000**
5 * RJ45, 3 * SC-Multimode	IE-SW-VL08MT-5TX-3SC	-40 to +75 °C	**1240970000**
5 * RJ45, 1 * SC-Multimode, 2 * SC-Singlemode	IE-SW-VL08MT-5TX-1SC-2SCS	-40 to +75 °C	**1345240000**
6 * RJ45, 2 * ST-Multimode	IE-SW-VL08MT-6TX-2ST	-40 to +75 °C	**1240990000**
6 * RJ45, 2 * SC-Multimode	IE-SW-VL08MT-6TX-2SC	-40 to +75 °C	**1344770000**
6 * RJ45, 2 * SC-Singlemode	IE-SW-VL08MT-6TX-2SCS	-40 to +75 °C	**1241020000**

Accessories

	Model Type	Order No.
External Backup and Restore Module	EBR-Module RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

Managed Fast Ethernet Switches

- Plug-n-play Turbo Ring and Turbo Chain (<20 ms @ 250 switches), RSTP/STP (IEEE 802.1w/D) for Ethernet redundancy
- IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module (External Backup and Restore Module) for system configuration backup (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ GMRP ▪ LACP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ Syslog ▪ DHCP Option 66/67/82 ▪ SSH ▪ SNMP Inform ▪ Modbus/TCP ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit (IE-SW-PL08M), 2 MBit (IE-SW-PL16M)
Interface	
Fibre Ports	100BaseFX ports (SC/ST connector)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo-ring, master, coupler, reserve (only IE-SW-PL08M)
LED Indicators	PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, electrically isolated • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA

Optical Fibre	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)	40 km (9/125 µm singlemode cable)
Saturation	-6 dBm	-3 dBm

Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-PL08M-8TX: 0.26 A @ 24 V IE-SW-PL08M-6TX-2SC/ST/2SCS: 0.36 A @ 24 V IE-SW-PL16M-16TX: 0.41 A @ 24 V IE-SW-PL16M-14TX-2SC/ST: 0.51 A @ 24 V

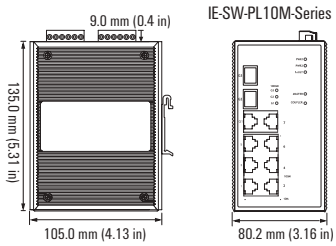
Power Requirements	
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	IE-SW-PL08M: 80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in) IE-SW-PL16M: 94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight	IE-SW-PL08M: 1040 g, IE-SW-PL16M: 1586 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F) (on request)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD): IE-SW-PL08M...Series: level 3 IE-SW-PL16M...Series: level 2; EN61000-4-3 (RS) level 3; EN61000-4-4 (EFT) level 3; EN61000-4-5 (Surge) level 3; EN61000-4-6 (CS) level 3; EN61000-4-8
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	IE-SW-PL08M...Series: 339,000 hrs IE-SW-PL16M...Series: 247,000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
8 * RJ45	IE-SW-PL08M-8TX	0 to 60 °C	1241040000
	IE-SW-PL08MT-8TX	-40 to +75 °C	1286780000
6 * RJ45, 2 * SC-Multimode	IE-SW-PL08M-6TX-2SC	0 to 60 °C	1241070000
	IE-SW-PL08MT-6TX-2SC	-40 to +75 °C	1286790000
6 * RJ45, 2 * ST-Multimode	IE-SW-PL08M-6TX-2ST	0 to 60 °C	1241080000
	IE-SW-PL08MT-6TX-2ST	-40 to +75 °C	1286800000
6 * RJ45, 2 * SC-Singlemode	IE-SW-PL08M-6TX-2SCS	0 to 60 °C	1241090000
	IE-SW-PL08MT-6TX-2SCS	-40 to +75 °C	1286810000
16 * RJ45	IE-SW-PL16M-16TX	0 to 60 °C	1241100000
	IE-SW-PL16MT-16TX	-40 to +75 °C	1286820000
14 * RJ45, 2 * SC-Multimode	IE-SW-PL16M-14TX-2SC	0 to 60 °C	1241120000
	IE-SW-PL16MT-14TX-2SC	-40 to +75 °C	1286830000
14 * RJ45, 2 * ST-Multimode	IE-SW-PL16M-14TX-2ST	0 to 60 °C	1241130000
	IE-SW-PL16MT-14TX-2ST	-40 to +75 °C	1286840000

Managed Gigabit Ethernet Switches

- 2 Gigabit Ethernet ports for redundant ring and 1 Gigabit Ethernet port for uplink solution
- Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
- EEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module - External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3ab for 1000BaseT(X) ▪ IEEE 802.3z for 1000BaseX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ Syslog ▪ DHCP Option 66/67/82 ▪ SSH ▪ SNMP Inform ▪ Modbus/TCP ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
Fibre Ports	1000BaseSFP-Slot (100BaseSFP modules are not supported)
RJ45 Ports	10/100BaseT(X) oder 10/100/1000BaseT(X) auto negotiation
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo-Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP-Port), 1000M (Gigabit-Port), MSTR/HEAD, CPLR/TAIL
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, but electrically isolated from the electronics • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA
Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-PL10M-3GT-7TX: 0.65 A @ 24 V IE-SW-PL10M-1GT-2GS-7TX: 0.44 A @ 24 V
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)
Weight	1170 g
Installation	DIN-Rail mounting

Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F); Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) Class A
EMC	EN61000-4-2 (ESD),level 3; EN61000-4-3 (RS),level 3; EN61000-4-4 (EFT),level 3; EN61000-4-5 (Surge),level 3; EN61000-4-6 (CS),level 3; EN61000-4-8
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	204.000 hrs
Database	MIL-HDBK-217J, GB 25 °C
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
3 * RJ45 10/100/1000BaseT(X), 7 * RJ45 10/100BaseT(X)	IE-SW-PL10M-3GT-7TX	0 to 60 °C	**1241290000**
	IE-SW-PL10MT-3GT-7TX	-40 to +75 °C	**1286930000**
1 * RJ45 10/100/1000BaseT(X), 2 * Slots 1000BaseSFP, 7 * RJ45 10/100BaseT(X)	IE-SW-PL10M-1GT-2GS-7TX	0 to 60 °C	**1241300000**
	IE-SW-PL10MT-1GT-2GS-7TX	-40 to +75 °C	**1286940000**

Accessories

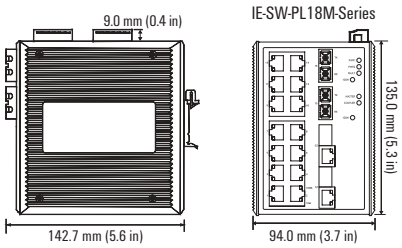
	Model Type	Order No.
External Backup and Restore Module	EBR-Modul RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

Note

The IE-SW-PL10M 1GT-2GS-7TX supports up to 2 1000Base SFP slots. Corresponding SFP modules for Gigabit Ethernet, see page F.6.

Managed Gigabit Ethernet Switches

- 2 Gigabit Ethernet ports plus 16 Fast Ethernet ports for copper and fibre
- Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
- EEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module - External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT(X) and 100BaseFX ▪ IEEE 802.3ab for 1000BaseT(X) ▪ IEEE 802.3z for 1000BaseX IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port-Trunk mit LACP	
Protocols	
IGMPv1/v2 ▪ GMRP, GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ Syslog ▪ DHCP-Option 66/67/82 ▪ SSH ▪ SNMP Inform ▪ Modbus/TCP ▪ LLDP ▪ EEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	2 MBit
Interface	
Fibre Ports	100BaseFX (SC/ST connection) and 1000BaseSFP slot (100BaseSFP modules are not supported)
RJ45 Ports	10/100BaseT(X) oder 10/100/1000BaseT(X) auto negotiation
Console Port	RS 232 (RJ45 connector)
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP-Port), 100M (Glasfaser-Port), MSTR/HEAD, CPLR/TAIL
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, but electrically isolated from the electronics. • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA

Optical Fibre	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62.5/125 µm multimode cable)	40 km (9/125 µm singlemode cable)
Saturation	-6 dBm	-3 dBm

Power Requirements	
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-PL18M-2GC-16TX: 0.51 A @ 24 V IE-SW-PL18M-SC/ST/SCS: 0.61 A @ 24 V
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight	1630 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX-Zone 2, Ex nC IIC
EMC	FCC Part 15, CISPR (EN55022) Class A EN61000-4-2 (ESD), level 2; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 2; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-12
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	240.000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
16 * RJ45 10/100BaseT(X), 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC-16TX IE-SW-PL18MT-2GC-16TX	0 to +60 °C -40 to +75 °C	**1241320000** **1286970000**
14 * RJ45 10/100BaseT(X), 2 * SC-Multimode 100FX, 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC14TX2SC IE-SW-PL18MT-2GC14TX2SC	0 to +60 °C -40 to +75 °C	**1241330000** **1286990000**
14 * RJ45 10/100BaseT(X), 2 * ST-Multimode 100FX, 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC14TX2ST IE-SW-PL18MT-2GC14TX2ST	0 to +60 °C -40 to +75 °C	**1241340000** **1287000000**
14 * RJ45 10/100BaseT(X), 2 * SC-Singlemode 100FX, 2 * Kombi-Ports[1]	IE-SW-PL18M-2GC14TX2SCS IE-SW-PL18MT-2GC14TX2SCS	0 to +60 °C -40 to +75 °C	**1241350000** **1287010000**

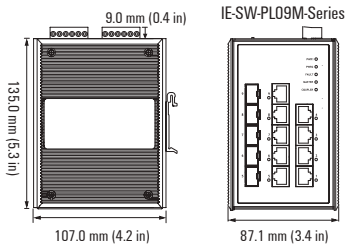
Note

The IE-SW-PL18M series supports up to 2 1000Base SFP slots. Corresponding SFP modules for Gigabit Ethernet, see page F.6.

[1] (10/100/1000BaseT(X) or 100/1000BaseSFP)

Managed Full Gigabit Ethernet Switch

- 4 10/100/1000BaseT(X) ports plus 5 combo (10/100/1000BaseT(X) or 100/1000BaseSFP slot) Gigabit ports
- Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
- IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
- EBR-Module - External Backup and Restoring Module for easy system reconfiguration (optional accessory)



Technical data

Standards	
IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3ab for 1000BaseT(X) ▪ IEEE 802.3z for 1000BaseX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ DHCP Option 66/67/82 ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ SSH ▪ Syslog ▪ Modbus/TCP ▪ SNMP Inform ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	ID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
Fibre Ports	100/1000Base SFP Slot
RJ45 Ports	10/100/1000BaseT(X) auto negotiation
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo-Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, 10/100/1000M, MSTR/HEAD, CPLR/TAIL
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Digital Inputs	2 inputs with the same ground, but electrically isolated from the electronics • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA
Power Requirements	
Input Voltage	12/24/48 V DC, redundant dual inputs
Input Current	0.81 A @ 24 V
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	87.1 × 135 × 107 mm (3.43 × 5.31 × 4.21 in)
Weight	1510 g
Installation	DIN-Rail mounting

Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508, EN60950-1
Hazardous Location	UL/cUL, Class I Division 2, Groups A, B, C and D (Pending); ATEX-Zone 2, Ex nC IIC (Pending)
EMI	FCC Part 15, CISPR (EN55022) Class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Maritime	DNV
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	330.000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Model Type	Operating Temperature	Order No.
4 * RJ45 10/100/1000BaseT(X)	IE-SW-PL09M-5GC-4GT	0 to 60 °C	**1241370000**
5 * Kombi-Ports[1]	IE-SW-PL09MT-5GC-4GT	-40 to +75 °C	**1287020000**

Accessories

	Model Type	Order No.
External Backup and Restore Module	EBR-Modul RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

Note

The IE-SW-PL09M series supports up to 5 100/1000Base SFP slots. Corresponding SFP modules for Fast/Gigabit Ethernet, see page F.6.

[1] (10/100/1000BaseT(X) or 100/1000BaseSFP)

Power-over-Ethernet switches
Power and data transferred in parallel

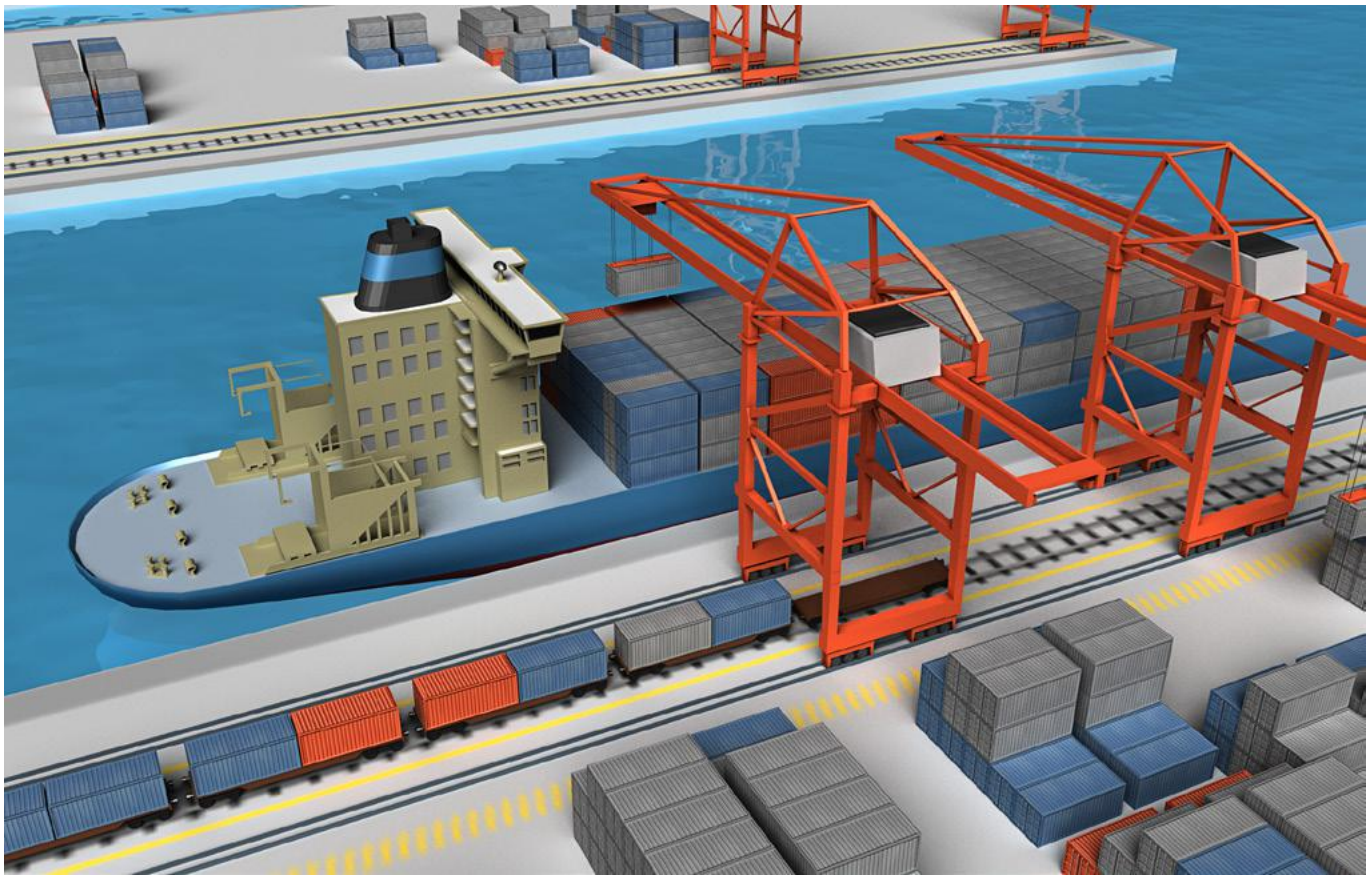
Power over Ethernet (PoE) describes a process where power can be supplied to a network-compatible device over the 8-wire Ethernet cable. In a narrower sense, PoE today means the IEEE 802.3af (DTE Power over MDI) standard which was adopted in June 2003.

The main advantage of Power over Ethernet is that you do not require a separate power supply cable and so can install Ethernet devices in hard-to-reach places or in areas where there is not sufficient room for many cables. This means that you can save some significant installation costs, and that you can also integrate the power supply into a central uninterruptible power supply (UPS) to improve the reliability of the connected devices.

PoE is used by network devices that need small amounts of power. It is typically used for IP telephones, network cameras, operating panels or wireless communications devices such as WLAN access points.

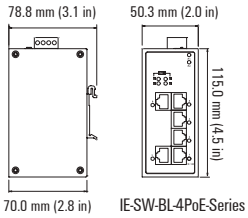
Weidmüller PoE switches support the IEE 802.3at standard (also known as PoE+) and can therefore supply end devices with up to 30 W per PoE port.

Weidmüller PoE switches also offer further advantages by their simple power supply needs. They do not require an additional 48 V supply in addition to the standard 24 V supply.



6-port IEEE 802.3af/at PoE+ unmanaged Ethernet Switch

- 4 IEEE 802.3af/at compliant PoE ports
- Up to 30 watts per PoE port
- 24/48 V DC redundant wide-range power supply
- Integrated DC/DC converter can supply 48 V-PoE devices across the entire input voltage range of 24 to 48 V DC
- Intelligent power consumption detection and classification
- Redundant dual V DC power inputs
- Broadcast Storm Protection



IE-SW-BL-4PoE-Series

Technical data

Technology	
Standards	802.3af/at for Power-over-Ethernet IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Switch Properties	
MAC table size	1 K
Packet buffer size	512 KB
Interface	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode and auto MDI/MDI-X connection
DIP Switches	Enable/disable broadcast storm protection
PoE pin assignment	V-, V-, V+, V+ for pin 1, 2, 3, 6 (endspan, MDI-X alternative A)
LED Indicators	PWR1, PWR2, 10/100M, PoE
Power Requirements	
Input Voltage	24/48 (20 to 60 V) V DC, 2 redundant inputs
Input Current	Max 7.5 A @ 24 V DC (supports up to 4 ports at 30 watts per PoE port)
Overload Current Protection	Present
Connection	1 removable 4-contact terminal block
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Aluminium, IP 30 protection
Dimensions (W x H x D)	50 × 115 × 70 mm (1.96 x 4.52 x 2.76 in)
Weight	375 g
Installation	TS 35
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	645.138 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering Information

Port Variants	Type	Operating Temperature	Order No.
2 * RJ45 10/100 BaseT(X), 4 * RJ45 10/100 BaseT(X) PoE+	IE-SW-BL06-2TX-4POE	0 to 60 °C	1241380000
	IE-SW-BL06T-2TX-4POE	-40 to +75 °C	1286920000

Accessories

	Type	Order No.
19" Rack Mounting Kit	RM-KIT	1241440000
Cable fixing kit	IE-CFK-05	1339610000

6-port IEEE 802.3af/at PoE+ managed Ethernet Switch

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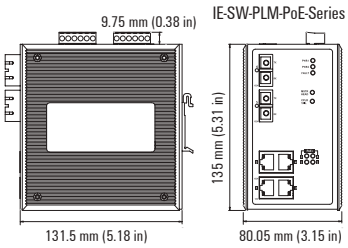
- Up to 30 watts per PoE port
- 24/48 V DC redundant wide-range power supply
- Integrated DC/DC converter can supply 48 V-PoE devices across the entire input voltage range of 24 to 48 V DC
- Extended PoE management functions, including PoE error checking or configuring the operational times of connected PoE devices



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Technical data

Standards	
IEEE 802.3at/af for Power-over-Ethernet ▪ IEEE 802.3 for 10BaseT ▪ IEEE 802.3u for 100BaseT (X) and 100BaseFX ▪ IEEE 802.3x for Flow Control ▪ IEEE 802.1D for Spanning Tree Protocol ▪ IEEE 802.1w for Rapid STP ▪ IEEE 802.1Q for VLAN Tagging ▪ IEEE 802.1p for Class of Service ▪ IEEE 802.1X for Authentication ▪ IEEE 802.3ad for Port Trunk with LACP	
Protocols	
IGMPv1/v2 ▪ GMRP ▪ GVRP ▪ SNMPv1/v2c/v3 ▪ DHCP Server/Client ▪ DHCP Option 66/67/82 ▪ BootP ▪ TFTP ▪ SNTP ▪ SMTP ▪ RARP ▪ RMON ▪ HTTP ▪ HTTPS ▪ Telnet ▪ SSH ▪ Syslog ▪ Modbus/TCP ▪ SNMP Inform ▪ LLDP ▪ IEEE 1588 PTP ▪ IPv6	
MIB	
MIB-II ▪ Ethernet-Like MIB ▪ P-BRIDGE MIB ▪ Q-BRIDGE MIB ▪ Bridge MIB ▪ RSTP MIB ▪ RMON MIB Group 1, 2, 3, 9	
Flow Control	
IEEE 802.3x flow control ▪ back pressure flow control	
Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256
MAC Table Size	8 K
Packet Buffer Size	1 MBit
Interface	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode and auto MDI/MDI-X connection
PoE pin assignment	V-, V-, V+, V+ for pin 1, 2, 3, 6 (endspan, MDI-X alternative A)
Console Port	RS 232 (RJ45 connector)
DIP Switches	Turbo Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, 10/100M, MSTR/HEAD, CPLR/TAIL, PoE
Alarm Contact	2 relay outputs with current carrying capacity of 1 A @ 24 V DC
Alarm Contact	2 inputs with the same ground, electrically isolated • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA
Power Requirements	
Input Voltage	24/48 (20 to 60 V) V DC
Input Current	Max. 7.8 A @ 24 V DC (supports up to 4 ports at 30 watts per PoE port)
Overload Current Protection	Present
Connection	2 removable 6-contact terminal blocks
Reverse Polarity Protection	Present
Technical data	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	80 x 135 x 131.5 mm (3.15 x 5.31 x 5.18 in)
Weight	1270 g
Installation	DIN-Rail mounting

Environmental Limits	
Operating Temperature	Standard Models: 0 to 60 °C (32 to 140 °F) Wide Operating Temp. Models: -40 to 75 °C (-40 to 167 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL 508
EMI	FCC Part 15, CISPR (EN55022) class A
EMC	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (mean time between failures)	
Time	433.000 hrs
Database	Telcordia (Bellcore), GB
Warranty	
Warranty Period	5 years

Ordering data

Port Variants	Type	Operating Temperature	Order No.
2 * RJ45 10/100 BaseT(X), 4 * RJ45	IE-SW-PL06M-2TX-4PoE	0 to 60 °C	**1241390000**
10/100 BaseT(X) PoE+	IE-SW-PL06MT-2TX-4PoE	-40 to +75 °C	**1286910000**

Accessories

	Type	Order No.
External Backup and Restore Module	EBR-Modul RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**