

ELECTRICAL STANDARDS for the INSTALLATION of JTL EQUIPMENT



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ELECTRICAL SPECIFICATION

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ELECTRICAL STANDARDS for the INSTALLATION of JTL EQUIPMENT

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All wiring must conform to BS 7671 i.e. IEE Regulations latest Edition.

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Section 1. Installation Practice

CABLE INSTALLATION REQUIREMENTS

When installing JTL Systems controllers into equipment, it is essential that the following requirements are observed.

1. Cable Segregation

Connections are divided into two groups:

- (i) Power/Control
- (ii) Signal

It is essential that the cables feeding these two groups be segregated. For detailed information of the connections please refer to the user guide supplied with each JTL unit. All JTL units are fitted with plugs and sockets for all connection so that units may be unplugged for servicing.

As a guide to identifying the connection group the following applies:

Circular DIN Audio and multipin connectors are always signal.

Two part screw connectors are generally power connections. Exceptions to this are some pressure and temperature sensor connections and some monitoring only products.

2. Signal Cables

Low voltage signals must run in multicore cable to ensure EMC requirements are met. This also helps avoid any confusion with power cables during installation or subsequent inspection.

Where signal cables are installed in enclosures with power equipment the cable should have a minimum insulation voltage rating of 250 V ac.

To prevent voltage drop all signal cables must have a minimum cross sectional area of 0.2 mm.

The use of telephone cable is not permitted or accepted under any circumstances.

All multi stranded cables connected to JTL screw connectors within enclosures should be bootlace ferruled with the correct size ferrule using the appropriate crimp connection tool.

All signal cables should be identified at each termination. Where possible these idents should be transferred to the relevant cable drawings, a set of which should be left on site.

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Signal cables are separated into two groups:

- (i) Common ground.
- (ii) JTL network (Jnet)

Signal cables should not be installed with power cables in common trunking, metal or plastic.

Twin compartment trunking is acceptable.

Minimum segregation distance between signal and power cables over long runs is 350mm (See note 1).

Signal cables should not be tie wrapped to piping.

Where Unistrut cable tray is installed the separation distance between signal and power cables should be at least 350mm.

Note 1: JTL acknowledge that in some circumstances due to on-site conditions, the 350mm segregation over the entire length of the cable run may not be possible. However, any deviations must be documented and the 350mm segregation re-established at the earliest opportunity.

3. Power Cables

All JTL controllers that drive electrical equipment have specified ratings. For full details refer to the appropriate user guide.

Generally however the following rules apply:

Maximum	ac voltage	240 volt
	dc voltage	50 volt
Maximum	ac/dc current	5 amp continuous resistive

Unless otherwise stated, JTL units are for single phase operation only.

4. High Voltage Testing

No JTL controller should be connected to any circuit undergoing high voltage "flash" testing.

5. Cable Installation within Enclosures

Where possible, there must be a minimum separation of 150 mm between parallel cable runs of power and signal cables.

Signal cables should **never** be installed in common trunking or bundled with power cables.

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Section 2. Electrical Wiring to JTL Network Equipment

1. JTL Network Controller

This unit should be installed at a convenient central location, typically a plant room. It should be mounted no more than 2 metres from the floor.

It must be fed with a clean 230 volt single phase supply via a fused spur at 2 amps. NO OTHER equipment should be fed from the fused side of this supply.

All entries to/from this controller must route via the removable gland plate at the base of the unit. NO OTHER additional holes are to be made in the enclosure.

All internal wiring should be identified and tie wrapped at regular intervals.

2. Alarm Annunciator

This unit is suitable for wall mounting and is "electrically safe". It should be located where it can draw attention to site staff to site alarm conditions. This unit should be fed via a fused spur at 2 amps to enable local isolation of the unit for service work. It should be mounted no more than 2 m above floor level.

3. Lighting Timer(s) for Case Lighting

This unit is "electrically safe" and is suitable for wall mounting. It should be located where site staff can operate the override systems. It should be mounted no higher than 2 m above floor level.

The units should be fed from a fused spur at 2 amps.

4. H&V and other Timer Units

These units are "electrically safe" and are suitable for wall mounting. They should be mounted in the vicinity of the associated electrical switchgear. They should be fed from a fuse spur rated at 2 amps.

5. Suction Pressure Optimiser(s)

This unit is "electrically safe" and is suitable for wall mounting. They should be located in the plant room adjacent to the associated compressor pack mounted no higher than 2 m above floor level.

Each Optimiser should be fed from a fused spur rated at 2 amps.

6. All other JTL units

This group covers items such as monitor cards, plant alarm cards, etc. These units should be located where convenient to the general installation.

They should be fed from a local supply, via a 230 volt fused spur at 2 amps.

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Section 3. JTL network (Jnet) wiring to/from JTL Controllers

Where Jnet network cables are run in parallel with power cables, there must be a minimum separation of 350 mm.

The cable should be installed with suitable mechanical support. If on a cable tray the separation is mandatory. Ideally the tray should be used for signal cables only, connected to JTL or other similar equipment such as H&V, EPOs, telephone or other network cables. If the cable is not mounted on a cable tray then it should be installed in conduit or trunking.

The Jnet network cables must NOT under ANY circumstances be tie wrapped to Steel Wired Armoured Cables, or Pipes.

If joints become a necessity, then a JTL network junction box or similar junction box should be used. In line, "chocolate block" and taped connections MUST NOT be used.

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Section 4. Petrol Filling Station & Store Timers

JTL timers are suitable for the switching of timed functions within the petrol filling station and store.

Normally the lighting timers together with over-ride switches for each circuit, are installed within the Electrical Distribution Panels, by the appropriate manufacturers.

Where external lighting is controlled, light sensors are provided. Light level sensor(s) should be installed on the exterior North Walls of the installation to avoid direct sunlight.

The number of sensors will be determined by the number of circuits being controlled by light level as opposed to timed channels.

The signal cabling from the lighting sensor to the lighting controller should be a 3 core flexible screened cable, with a maximum Cross Sectional Area of 0.5 mm.

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Section 5. Energy Metering

The system comprises of three main components, a set of Current Transformers, a kWatt Hour meter and a JTL kWh Monitor card.

JTL drawing No.01874 shows how these three components connect together to form the system.

1. Current Transformers (CT)

The current transformers should be located on the load side of the MCCB(s) supplying the Panel. One CT should be fitted on each phase.

Ideally, where there is a bus-bar extension fitted to the output terminals of the MCCB, a Current Transformer for busbar mounting should be installed.

Alternatively a Current Transformer is required with a window diameter suitable for the outgoing cable. Where there are a pair of cables in parallel feeding the panel, the Current Transformer would be matched to the required aperture.

The Current Transformer should have its primary coil rated, to either the design current of the load, or to the rated RMS current of the MCCB, taking into consideration the rating of the supply cable that it is protecting. The primary rating should be chosen from the following values to match the kWh meters.

40 A	200 A	1000 A
50 A	300 A	1200 A
60 A	400 A	1500 A
75 A	500 A	2000 A
100 A	600 A	3000 A
120 A	750 A	6000 A
150 A		

It is essential that the Current Transformer is fitted with the correct polarity; where the current is passing from the P1 to the P2 side of the CT.

P1 should face the supply and P2 should face the load.

The secondary coil of the Current transformer should be rated at 5 amps to match the input of the Energy Meter.

Current transformers for this application are specified as class 0.5.

The secondary coil of the CT, is simply identified by S1 & S2 screw contacts.

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2. Electrical Energy Meter

The electrical energy meter that is normally supplied is type number 96CTEP3/S. This is designed to read either kWh or mWh on a three phase, four wire unbalanced load. This meter supplies a variable pulsed output that is required to drive the JTL kWh monitor unit type PR110.

Drawing No. 01874, shows how the secondary coil contacts S1 & S2 link to the Energy Meter.

Line 1 (Red) would connect to terminal 1(S1) & terminal 3(S2).

Line 2 (Yellow) would connect to terminal 4(S1) & terminal 6(S2).

Line 3 (Blue) would connect to terminal 7(S1) & terminal 9(S2).

A three phase voltage supply is also required to drive the Power Meter as follows;-

Line 1 (Red) to terminal 2

Line 2 (Yellow) to terminal 5

Line 3 (Blue) to terminal 8

This supply should be through suitable fused isolation.

Connections to the power meter should be 1.5 mm² cable.

Solid conductor cable should not be used.

Each cable should be identified at each termination in the normal manner within the panel.

The power meter will require an auxiliary 230 volt single phase supply. This supply would normally come from the red phase of its three phase metering supply.

3. Energy Monitor Card

The JTL PR110 monitor card receives a pulsed output from the Energy Meter. When connected to the JTL network controller via the Jnet network, it provides the required energy readings.

These readings can be viewed both on the on-site computer, and remotely by dialling in remotely.

This unit should be installed in a position where access is available to the JTL engineer. It is electrically safe but is not designed for unprotected installation.

It requires a 230 volt single phase supply that can be isolated locally, preferably by a spur outlet fused down to 2 amps.

The pulse input to this card from the energy meter is by means of a two core signal cable.

The Jnet network output from this card is connected to one of the zones of the Communications Network Controller via a 2 core Jnet network cable. The termination of this cable will be part of the commissioning programme undertaken by JTL.

Drawing 01874 applies.

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Section 6. Cable Specification

1. Jnet Network Cables

(i) From JTL network controller to JTL controllers

CAT5 UTP (unscreened twisted pair) cable should be used for this purpose, terminated in appropriate JTL marshalling and junction box.

Applicable drawings:

New installations 03118

Legacy installations 03120

(ii) From the JTL network controller to the on-site PC

For CU type network controllers

3 off Category 5, unscreened twisted pair cables should be run from the network controller to the on-site PC.

The 3 Cat5 cables provide the following functions:

- 1) Telephone extension from the Network Controller to the PC
- 2) Communications between the Network Controller and the PC
- 3) An IP connection to the SiteSuite PC

At the SiteSuite PC the cables should terminate in 2 single patch boxes (2 cables into one box and one to the other). These should be wall mounted or fixed in trunking within 1m of the SiteSuite PC. JTL terminate both ends of the cables during network commissioning.

If the cable run is more than 20 m then JTL Line Drivers must be fitted at each end of the network controller to PC cable.

Applicable drawing:

02720

Telephone cable and other low voltage insulated cables are not accepted.

For NC type network controllers

NC series controllers must be located within 1m of the SiteSuite PC.

Cat5 cables are not required for this type of controller.

2. Power Cables

Where JTL units are fed from a fused spur, then the interlink cable should be a 3 core flex, with a cross sectional area no greater than 1.5 mm.

If the interlink cable is longer than 300 mm, then it should be installed within conduit for added mechanical protection.

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Section 7. Electromagnetic Compatibility (EMC)

All ac outputs on JTL controllers are suppressed internally within the controller.

A resistor/capacitor network connected between the Load and the neutral achieves the required suppression.

For this to be effective, it is essential that the relay contacts are wired correctly ie, "line" and "load" connections are correctly observed, for this purpose all relay terminals are clearly marked thus:

LN indicates line
LD indicates load
C indicates line (common)
NO indicates load (normally open contacts)
NC indicates load (normally closed contacts)

Since the suppressors are internally connected to the neutral, it is essential that Line(L), Neutral(N) polarity is observed on all power connections.

In the event of polarity not being correct, data corruption or processor mis-operation may occur.

For EMC operation to be correct, all cabling must be installed correctly according to sections 1, 3 and 6 of this document.

Documents to refer to:

Doc No. 01874 Schematic diagram for Electrical Energy Monitor
Doc No. 02720 Site PC to Network controller connections diagram
Doc No. 03118 Shop floor wiring schematics (New installations)
Doc No. 03120 Installation of new zone wiring to legacy installations