

LonMark Terminal Unit Controller

IQLVAV LonMark Terminal Unit Controller



Description

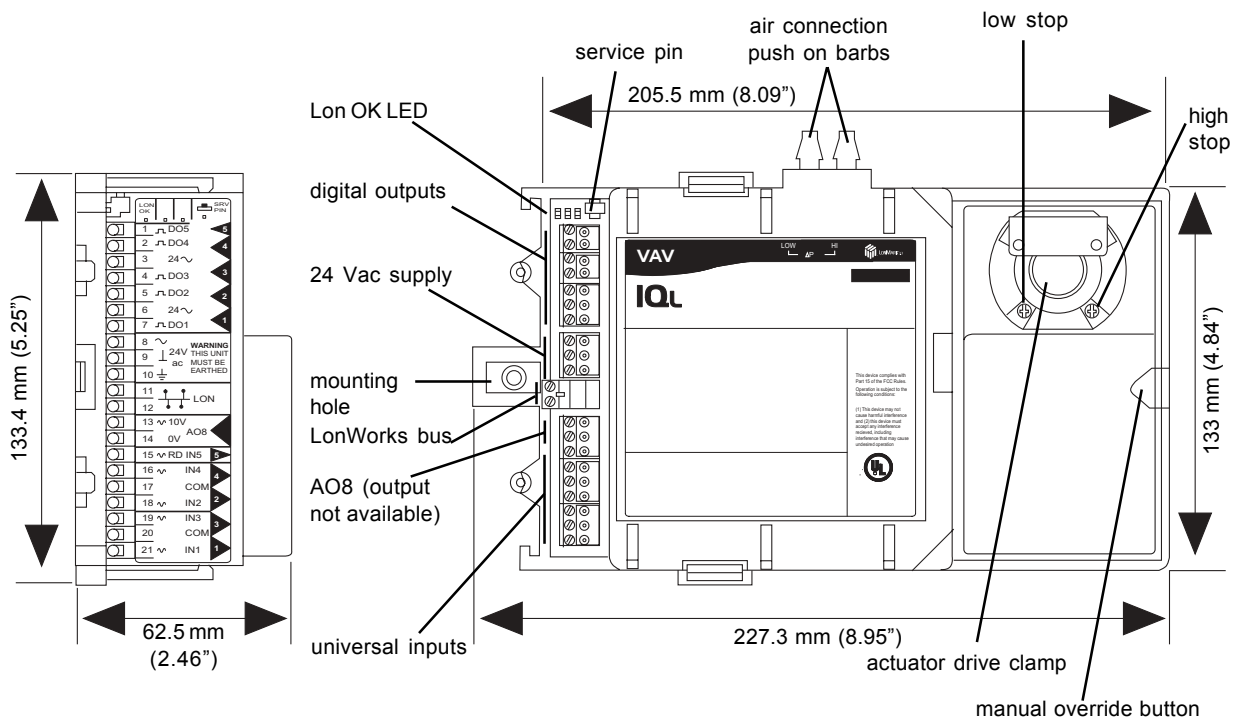
The IQLVAV is a terminal unit controller with integral actuator which will clamp to the damper drive shaft. It can be networked using LonWorks and can communicate with other IQLs and LonMark devices using LonWorks, and with IQ System current loop networked devices using a LINC unit. It has 5 universal inputs, one of which can be linked as a TBus connection (for use with RD), as well as an integral differential pressure sensor (0 to 2 inwc; 0 to 500 Pa). It has five digital (triac) outputs.

Features

- Low cost terminal unit controller.
- Fully compatible with IQ System
- *LonMark certified
- Integral differential pressure sensor
- Integral damper actuator
- No binding for network of only IQ system devices
- Non-volatile memory, no battery required
- *Conforms to LonMark profile 8502

Note that LonMark certification does not apply to custom strategies

Physical



FUNCTIONALITY

The IQLVAV consists of generic hardware and the IQL series core firmware. It is supplied complete with a pre-programmed strategy which defines its interaction with VAV equipment. If the unit is ordered with a standard strategy (e.g. IQLVAV/VAV), the strategy is defined in the strategy data sheet (e.g. IQLVAV/VAV standard strategy data sheet TA200750).

FIRMWARE

The following modules are available for configuration by terse text comms. They are described in the IQ System LonWorks Products Engineering Manual TE200292.

Core modules

Address module (R); Analogue array (A); Digital array (B)
Time (T)

Strategy modules

Sensor (S), (analogue - thermistor, potentiometer, or differential pressure); Sensor (S), (internal); Loop (L); User (U)
Logic (G), (combination, timer)
Function (F), (hysteresis, gate, multiplier, adder, A to D, square root, filter, rescale to, comparator)
Switch (W); Knob (K); Driver (D), (digital, raise/lower, time prop., Digital Input (I)
IC Comms (N); Plot channel (P); Display (~); Directory (@)

Compatibility

The IQL will identify itself as an IQL to w comms. The 945 should be set up to detect it as an IQ151 V7.

Alarms

The IQ System LonWorks Products Engineering Manual fully describes alarms.

The IQLVAV generates network alarms as follows (if appropriate alarm target address and Lan number are set up in address module):

“IQL -Rem LAN From yyy on Lan xxx-

LON LAN Broken NKBK” - a break in Lan communications

LON LAN Changed NKCH” - a node has gone from or been added to the Lan

LON LAN OK NKOK” - Lan communications are restored

“IQL - Int'wrk From yyy on Lan xxx-

LON lwrk Broken NKBK” - a break in internetwork communications

LON lwrk Changed NKCH” - a node has gone from or been added to the internetwork

LON lwrk OK NKOK” - internetwork communications are restored

The IQLVAV generates the following input alarms. They will be sent to Own Lan alarm reporting address and Lan number if these are set up in the address module:

Sensor alarms:

SENSOR FAIL occurred (OUTL),
SENSOR FAIL cleared (COUT),
INPUT ERROR occurred (READ),
INPUT ERROR cleared (O/K).

Note that no sensor alarms are generated for 30 s from power on. From this point any alarms that change state (i.e. from alarm to OK or OK to alarm) will be generated; any steady state existing alarms or those that occurred during power off will not be reported.

Digital input alarms:

DIGIN OFF occurred (DI=0)
DIGIN OFF cleared (CDI0)
DIGIN ON occurred (DI=1)
DIGIN ON cleared (CDI1)

Loop deviation alarms:

DEVIATION occurred (SDEV)
DEVIATION cleared (CSDV)

All these alarms are same format as IQ alarms except that time and date fields are filled with spaces.

HARDWARE

Unit

The IQLVAV is a small terminal controller designed for mounting on a damper. It has a plastic housing with two point mounting: the actuator shaft, and a screw mounting hole (screw provided).

Input power

The IQLVAV requires 24 Vac $\pm 15\%$, 50/60 Hz, at 15 VA internal power, plus the power required by the triac outputs. The triac outputs are rated at 0.7 A per channel and there are 5 channels. Therefore:

Total VA (maximum) = 15 + (5x0.7x24) = 99 VA

Due to UL requirements for Class 2 devices, the power source used to power the controller cannot exceed 100 VA. Also the loads must have EMF protection. This protection may be integral to the load or installed across the load's coil.

The IQLVAV input power return should be earthed (grounded) at the transformer. As the input power return terminal (9) is isolated from the earth (ground) terminal (10), these two terminals should be linked together at the IQLVAV.



Note that the IQLVAV must be earthed (grounded).

Fusing

The input power is protected by a self-resetting thermal device; this protects the IQLVAV board from drawing excessive current from the input power. The 24 Vac input power to the triac outputs is protected by a 6.3A thermal fuse.

Service Button

This is used during the installation of the IQLVAV into a LonWorks network management tool. This is only necessary under conditions described in the LonWorks Integration section below. During the installation process, the tool will request to be informed of the presence of the IQLVAV; this is done by pressing the 'service' button. As the button is pressed the 'service' LED below the button is illuminated.

Pressing the button also generates an alarm message forwarded by the 3xtend/EINC L or LINC to its target alarm address (if set up) which identifies IQLVAV by means of its neuron ID; this can be used as an attribute to find the IQLVAV's device address and Lan number.

LonWorks

The integral LonWorks transceiver uses FTT (or LPT) which has the following features:-

- (1) Use of free bus topology enabling star, bus, or loop wiring simplifies installation and facilitates network expansion.
- (2) The bus uses two wires (twisted pair) which are polarity independent with no need for screen.
- (3) The FTT runs at 78 k baud.
- (4) The FTT LonWorks may already be present in a building, so the IQ system is able to make use of an existing building bus and hence reduce installation cost.

Lon OK Indicator

This green LED flashes approximately every 24 s while the local Lan of IQLs is being built, after which it stays on indicating that the IQLVAV has successfully communicated with at least one other IQ System device on LonWorks. If the IQLVAV does not receive any messages (i.e. a deaf IQLVAV), it will flash every second.

Backup

The data (shell firmware, strategy, parameters, logged data) is stored in flash memory which is non-volatile in the case of power failure. The flash memory is only written to at midnight or after a write to the address module in order to prolong the life of the flash memory.

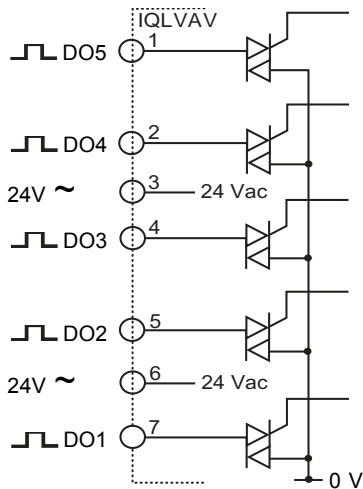
HARDWARE (Continued)

Any changes to sensor or driver types should be terminated by a text comms reset command R(z=1) to immediately write the changes to flash and reset the unit; note that this command clears logged data and sets the time to zero. Any other parameter changes (other than address module changes and changes to current time) should be terminated by the text comms command R(z=0) to immediately write the changes to flash.

Outputs

Triac Outputs (DO1 to DO5)

These outputs can switch 24 Vac at up to 0.7 A.



Note that output channels 6 and 7 (DO6, 7) are used to drive the damper actuator; output channel 6, raise, output channel 7, lower.

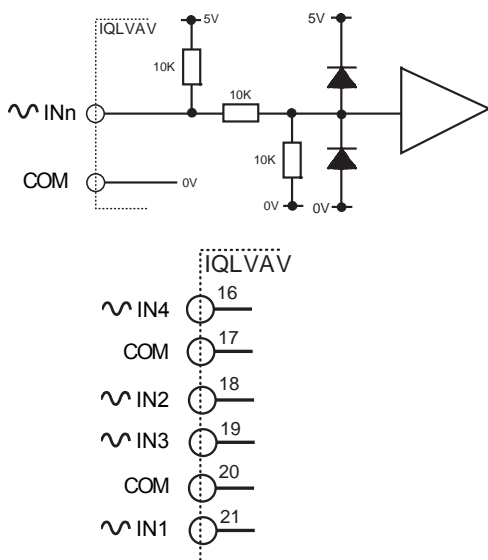
AO8

This output is not available (i.e. not enabled by firmware).

Inputs

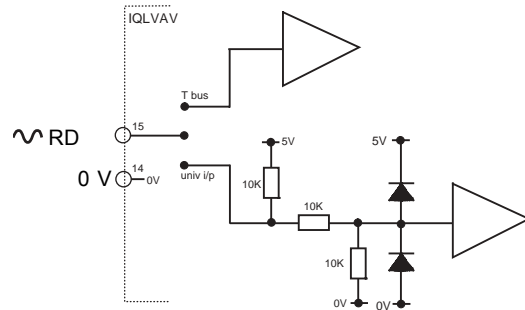
Universal Inputs

These inputs can be used for either voltage input, resistance input, or digital input status monitoring. All monitoring circuits are constantly connected to the inputs with the strategy selecting which monitoring circuit to read.



Universal Input or TBus

Input channel 5 (IN5) can be configured using a link (J5) either as a universal input (IN5 position, default), or as a TBus input (RD position). The universal input configuration is as is described above. The TBus input configuration is for connection of an RD-IQL, and is a serial input which has a maximum distance from RD to IQLVAV of 30 m (32 yds).



The RD, 3 digit room display, has the following appropriate versions:

RD-IQL/K local thermistor temperature sensor plus setpoint control potentiometer

RD-IQL/KOS as for /K plus occupation override pushbutton and occupation status display

As well as moving the J5 link, the IQLVAV requires a few strategy configuration changes to run with the RD. These are described in the strategy data sheet. IqlTool2 facilitates these changes.

Connecting an RD renders some of the normal features inoperative:

RD-IQL/K: The RD's potentiometer must be used if a potentiometer is required, (not IN2 for IQLVAV/VAV). A separate sensor connected to IN1 (for IQLVAV/VAV) may be used instead of the RD's; this is achieved by maintaining the normal sensor type for IN1. There will be no alarm contact or pushbutton input (for IQLVAV/VAV).
RD-IQL/KOS: The same as for RD-IQL/K but the /KOS gives use of its pushbutton.

TBus Link

There is a separate link, J6, to change the TBus (S position) to an Alerton bus (A position). This is set by default to the TBus position and should be left in this position.

Sensors

The sensor inputs can be replaced by the RD (see above) or by using one of the TB/TS range of wall mounting sensors:

TB/TS thermistor temperature sensor

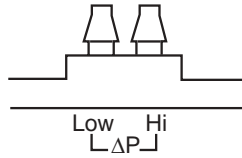
TB/TS/K as TB/TS plus setpoint control potentiometer

TB/TS/KE as TB/TS/K plus occupation override pushbutton

HARDWARE (Continued)

Differential Pressure Sensor

The IQLVAV has two air pressure ports (Hi and Lo) for connecting the integral differential pressure sensor to the air duct. The port connections consist of push on barbs for 3/16" (4.75 mm) ID tubing. The input is scaled for 500 Pa (/VAV), 2 inwc (/VAV/USA) full scale. The input will report an alarm at -62.5 Pa (-0.25 inwc).



The zero offset is required to be locally calibrated during installation. The pressure pipes are disconnected, and Low and Hi ports are connected together to produce zero differential pressure. The strategy's sensor offset (S14(O)) should be adjusted using text comms to produce a sensor reading of zero.

The sensor measurement accuracy after local zero offset calibration is given in the specification section (at the rear of this document).

Note that the pressure measurement is for use within closed loop VAV control operation. The error figures are provided to allow absolute pressure (or corresponding flow rate) accuracy to be determined where an identifier of such is required.

The total error can be calculated from the quoted accuracies as follows:

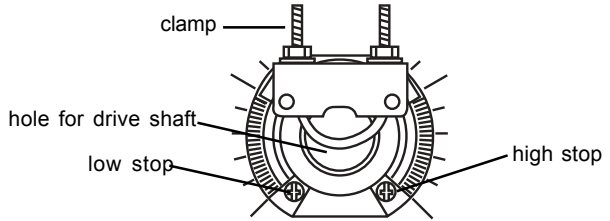
$$\text{total error (Pa)} = \text{differential pressure} \times \frac{\text{accuracy}}{100} + \text{zero offset} + \text{non-linearity}$$

Please note that large cycles of temperature and/or pressure will introduce further zero offset errors which will require a further local calibration (as described above) to reduce errors to the values specified.

Note that any calibration for the box constant in the standard strategies should be done after local calibration for zero offset.

Actuator

The integral rotary actuator will clamp to a shaft of 1/4" to 5/8" (6.35 mm to 15.9 mm) diameter. The actuator will rotate a maximum of 95°, but the damper drive has two motor stops which prevent the actuator overdriving the damper. These are set during the installation process by setting the damper to its central position, clamping the drive to the damper, rotating the damper completely closed and setting the low stop, and then rotating the damper completely open and setting the high stop.



If the damper stops are changed it may be necessary to change the VAV Damper driver full scale drive time set by the strategy, parameter D5(D). The time should be measured in seconds from fully closed to fully open and the parameter changed if necessary using text communications i.e. D5(D=x).

Smart Display Unit

The SDU-LON, smart display unit, enables the user to view and adjust selected parameters (sensors, knobs, drivers, switches, digital inputs) using a 4 x 20 character electroluminescent display, and four illuminated pushbuttons. It provides the IQLVAV with a real time clock, a time zone, and a calendar. It is associated with a particular IQLVAV either using a combination of the pushbuttons, or using IQLTool2.

SYSTEM

Full system details are covered by IQ System LonWorks Products Engineering Manual.

LonWorks bus

The IQLVAV is an IQ controller which uses the LonWorks bus as its communications network. It is LonMark compliant and will communicate with other LonMark devices.

LonWorks Integration

In a LonWorks system consisting only of IQ System devices no LonWorks installation is required as IQ System LonWorks products self-install. Installation onto a LonWorks network management tool is only necessary if it is required to bind LonMark devices to the IQL strategy variables, if LINC's, pre-version 3.23, straddle a router, if other devices on LonWorks have address conflicts with IQ System LonWorks devices, or if IQLROUTERS are used on an installed system. If one IQ System LonWorks device is installed, all IQ System LonWorks devices must be installed. From a LonWorks perspective the IQLVAV is supplied in a configured state i.e. it will install on the network with its address set up and communicate using IQ system communications. It can be set to an unconfigured state using a LonWorks Management Tool.

IQL address

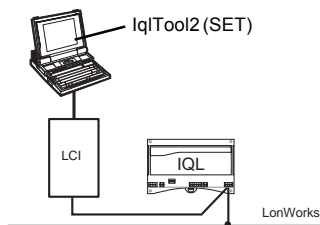
The IQLVAV device and Lan number are set up in the factory on a rolling basis, so in a batch of IQLVAVs, each will have a different factory address (printed on the unit's label along with its neuron ID). IQ System LonWorks devices on the same Lan must be on same LonWorks subnet (and hence same side of LonWorks router). An IQLVAV may be re-addressed by terse text comms (IqlTool 2 recommended). New addresses should be written on the unit's label; a tear-off adhesive label strip with unit ID and address information can be used for a paper record e.g. log book.

Communication

The 3xtend/EINC I, or LINC acts as an interface between the IQ System current loop Lan and the LonWorks bus. It enables IQLVAVs to communicate with IQ System Supervisors using terse text comms and with IQ System IQs using IC Comms. The 3xtend/EINC L is the preferable interface, but if the system is installed on a LonWorks Management Tool, the LINC must be used. If the IQLVAV is bound to other LonMark devices it communicates with them using Network Variables (NVs) as shown in accompanying table. The binding to a variable is done by using both SNVT (standardised network variable type) and NV name for each variable. All the network variables are described in the manual TE200292. Those required for the LonMark Node and LonMark profile 8502 compatibility are shown in the adjacent table (custom strategies may not have these variables).

IqlTool2

IqlTool2 software tool connects directly to the LonWorks segment by way of the LCI (LonWorks Comms Interface) using adaptor cables supplied with the interface. It runs on a PC on which SET v5.1 or greater has been installed.



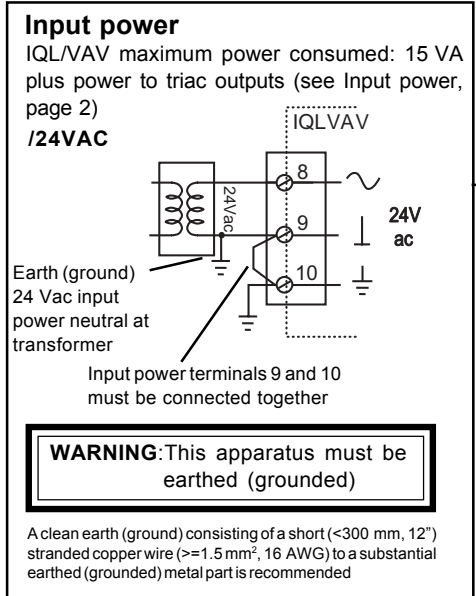
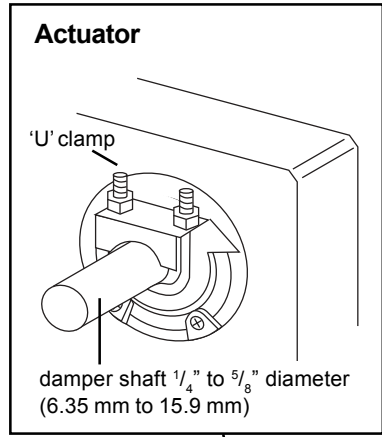
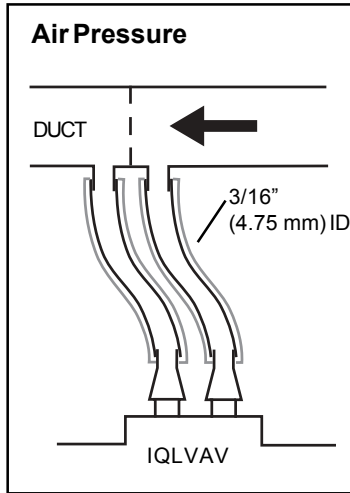
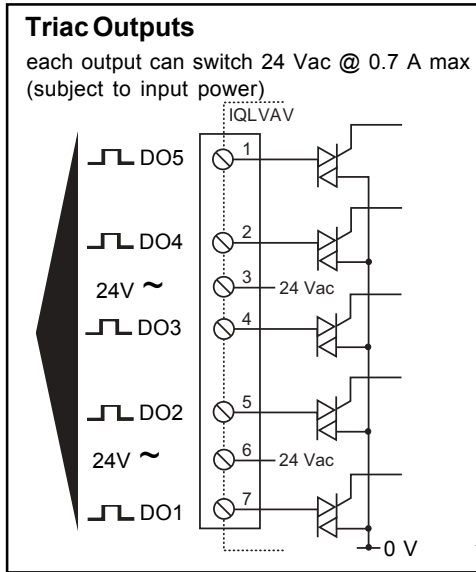
IqlTool2 facilitates mapping the LonWorks segment, resolving duplicate addresses on LonWorks, water balancing (e.g. IQLVAV/VAV strategy HWS output), identifying using service button, associating with SDU-LON, monitoring inputs and exercising outputs, setting as a timekeeper, and configuring for RD. It provides access to text communications for changing module parameters (e.g. knobs, switches).

nv name	SNVT	Strategy Var.	Label
LonMark Node			
Mandatory Network Variables			
nviRequest	SNVT_obj_request		
nvoStatus	SNVT_obj_status		
Optional Configuration Properties			
nciNetConfig	SNVT_config_src		LonWorks Managed
nciMajDevVer	SNVT_lev_disc		
nciMinDevVer	SNVT_count		
Manufacturer Defined Section			
nciDomainIndex	SNVT_count		LonWorks domain index
nciDomainWide	SNVT_count		LonWorks domain wide
nciMsgCode	SNVT_count		LonWorks message code
nciBufferSize	SNVT_count		Router buffer size
nviCurrDateTime	SNVT_time_stamp		
nviSecurity Code	SNVT_count		
nvoGenerator	SNVT_count		
LonMark Profile 8502			
Mandatory Network Variables			
nviSpaceTemp	SNVT_temp_p	K2	RemoteSpaceTemp
nvoSpace Temp	SNVT_temp_p	S1	Space Temp
nvoUnitStatus	SNVT_hvac_status		
Optional Network Variables			
nviSetpoint	SNVT_temp_p	K1	Remote Setpoint
nviOccManCmd	SNVT_occupancy	K6	Remote Occ
nvoEffectSetPt	SNVT_temp_p	S2	Setpoint
nvoEffectOccup	SNVT_occupancy	S3	Occupancy
nvoFanSpeed	SNVT_switch	I1	Fan Enabled
nvoHeatPrimary	SNVT_lev_percent	S4	Heating Demand
nvoCoolPrimary	SNVT_lev_percent	S5	Cooling Demand
nvoAirflow	SNVT_flow	S8	Actual Air flow
nvoDischAirTemp	SNVT_temp_p	S6	nvoDischAirTemp
Mandatory Configuration Properties			
nciSndHrtBt	SNVT_time_sec		
nciSetpoints	SNVT_temp_setpt		
Optional Configuration Properties			
Manufacturer Defined Section			
nvoA7	SNVT_temp_p	S7	Active Air Flow SP
nviA19	SNVT_temp_p	K3	OCC Deadbnd
nviA20	SNVT_temp_p	K4	Standby Deadbnd
nviA21	SNVT_temp_p	K5	NOCC Deadbnd
nviA23	SNVT_flow	K7	
nviA24	SNVT_temp_p	K8	
nviB18_0	SNVT_switch	W1	Boost Mode
nviB18_1	SNVT_switch	W2	Serial Fan Ena
nviB18_2	SNVT_switch	W3	Elec Disable
nviB18_3	SNVT_switch	W4	
nviB18_4	SNVT_switch	W5	
nviB18_5	SNVT_switch	W6	
nviB18_6	SNVT_switch	W7	
nviB18_7	SNVT_switch	W8	Remote Shutdown
nvoB1_1	SNVT_switch	I2	Unit Occupied
nvoB1_2	SNVT_switch	I3	Unit Unoccupied
nvoB1_3	SNVT_switch	I4	
nvoB1_4	SNVT_switch	I5	Unit in Standby
nvoB1_5	SNVT_switch	I6	
nvoB1_6	SNVT_switch	I7	
nvoB1_7	SNVT_switch	I8	

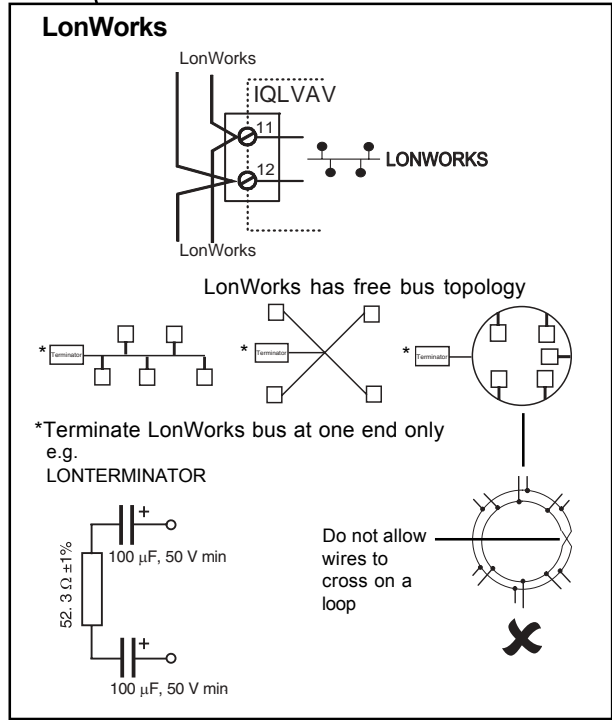
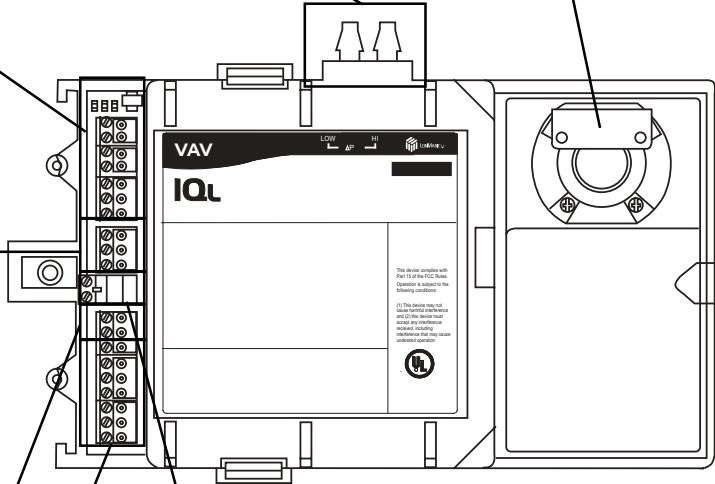
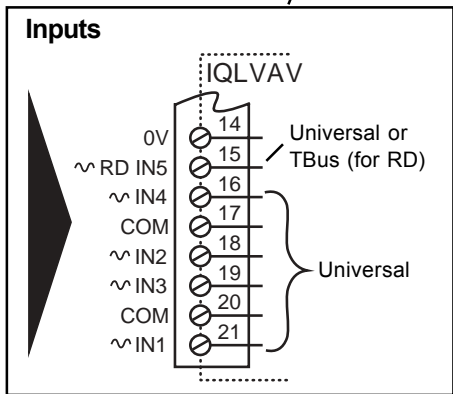
Table of Network Variables for IQLVAV

INSTALLATION

CONNECTIONS



AO8
This output is not available



INSTALLATION (continued)

The IQLVAV must be installed inside a protective case (if not well outside normal reach e.g. behind a false ceiling). It should be mounted on the damper shaft and mounted to an adjacent flat surface using the self tapping screw (provided). The IQLVAV installation involves the following procedure:

Mount the unit on the damper and secure using screw provided	Check IQ System communications
Set actuator stops to prevent actuator overdriving damper	Configure core module parameters if required
Attach differential pressure sensor tubes from duct	Set up with LonWorks Management Tool if required (see LonWorks integration above) and bind any network variables
Connect input power (do not switch on)	Configure strategy parameters if required
Earth (ground) unit	Configure rest of system
Connect LonWorks network	Test system
Connect I/O	
Switch on power to unit	

Note: If installation on a LonWorks Management Tool is required, the installer must have LonWorks engineering expertise

The installation procedure is covered by the following installation instructions:


IQLVAV/xxx/, ../VAV Installation Instructions, TG200704

IQLVAV/xxx/, ../VAV/, ../USA Installation Instructions, TG200978

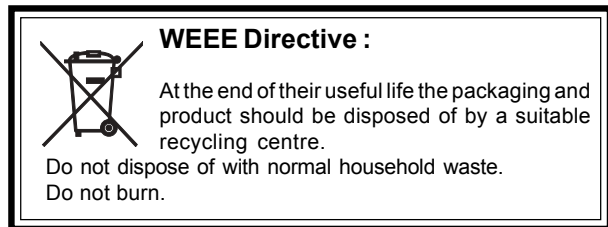
If supplied with a custom strategy, also see appropriate strategy installation instructions.

DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF IQLVAV CONTROLLER. No parts affected.

RECYCLING. 

All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.



ORDER CODES

UK Order Codes	USA Order Codes	
IQLVAV/VAV/24VAC	(not sold in US)	:IQLVAV module with /VAV strategy
IQLVAV/VAV/USA/UL/24VAC	882001280 (US only)	:IQLVAV module with IQLVAV/VAV/NOVAR strategy
SDU-LON	(not sold in US)	:Wall mounting Smart Display unit enables display and adjustment of control parameters. Connects to LonWorks.
SDU-LON/WSA/USA	882001430	:Wall mounting Smart Display unit enables display and adjustment of control parameters. Connects to LonWorks. Supplied with wall sensor adaptor and appropriate screws.
RD-IQL/K	(not sold in US)	:Room display with local thermistor temperature sensor plus setpoint control potentiometer
RD-IQL/K/WSA/USA	882001530	:Room display with local thermistor temperature sensor plus setpoint control potentiometer. Supplied with wall sensor adaptor and appropriate screws.
RD-IQL/KOS	(not sold in US)	:As for RD-IQL/K plus occupation override pushbutton and occupation status display
RD-IQL/WSA/USA	882001540	:As for RD-IQL/K plus occupation override pushbutton and occupation status display. Supplied with wall sensor adaptor and appropriate screws.
WSA/10/USA	882001560	:Pack of 10 wall sensor adaptor plates to facilitate mounting SDU/RD on US or Danish wall boxes. Each plate complete with 2 plastic covers, 2 back box screws, and two 3.5 mm SDU/RD screws
TB/TS	882000540	:Wall mounting thermistor space temperature sensor
TB/TS/K	882000560	:As TB/TS plus setpoint control potentiometer
TB/TS/KE	882000630	:As TB/TS/K plus occupation override pushbutton
NETB/LONC/[version]/230	(not sold in US)	:LonMark Object Node Controller enables communication with other LonMark devices (see version table below). Requires 230 Vac input power
NETB/LONC/[version]/24	(not sold in US)	:LonMark Object Node Controller enables communication with other LonMark devices (see version table below). Requires 24 Vac input

Version	inputs/outputs
/EN48A/FTT	48 enumerated inputs
/IN48A/FTT	48 integer inputs
/FL48A/FTT	48 floating inputs
/EN48S/FTT	48 enumerated outputs
/IN48S/FTT	48 integer outputs
/FL48S/FTT	48 floating outputs
/GEN/FTT	8 integer, + 8 floating, + 8 enumerated inputs, + 8 integer, +8 floating + 8 enumerated outputs

NETB/LONC/[version]/USA/24	882000290 (US only)	:LonMark Object Node Controller enables communication with other LonMark devices (see version table below). Requires 24 Vac input power
*3XTEND/EINCL/230	not available in USA	:Node controller which enables LonWorks bus to be used as part of IQ System. Connects IQLs to IQ System current loop network and Ethernet. 230Vac power.
*3XTEND/EINCL/24	not available in USA	:Node controller which enables LonWorks bus to be used as part of IQ System. Connects IQLs to IQ System current loop network and Ethernet. 24 Vac power.
*3XTEND/EINCL/USA/UL/24	882001600	:UL rated node controller which enables LonWorks bus to be used as part of IQ System. Connects IQLs to IQ System current loop network and Ethernet. 24 Vac power.
*NETB/LINC/FTT/230	(not sold in US)	:Node controller which enables LonWorks bus to be used as part of IQ System. Connects IQLs to IQ System current loop network. Requires 230 Vac input power.
*NETB/LINC/FTT/24	(not sold in US)	:Node controller which enables LonWorks bus to be used as part of IQ System. Connects IQLs to IQ System current loop network. Requires 24 Vac input power.
*NETB/LINC/FTT/USA/24	882000280 (US only)	:Node controller which enables LonWorks bus to be used as part of IQ System. Connects IQLs to IQ System current loop network. Requires 24 Vac input power.

**Note that the 3xtend/EINCL should be used as preference; LINC must be used if system installed on a LonWorks Management Tool*

PACK/LNC2/LONFTT/STD	(not sold in US)	:LanCard node controller providing an RS232 to IQ system current loop Lan node and then to LonWorks using the Lan (LNC/Lan/LINC function) on a PCI bus card. Includes wallbox and 2 adapter cables.
PACK/LNC2/LONFTT/STD/USA	882000310 (US only)	:LanCard node controller providing an RS232 to IQ system current loop Lan node and then to LonWorks using the Lan (LNC/Lan/LINC function) on a PCI bus card. Includes wallbox and 2 adapter cables.
LCI/USB	882001460	:LonWorks Commissioning Interface. Portable LonWorks node which connects PC to LonWorks using an USB connection. Used for order commissioning and fault finding IQ Systems on LonWorks.

ORDER CODES (continued)

UK Order Codes	USA Order Codes	
LONTERMINATOR	882000350	:Universal LonWorks terminator FTT, LPT-10, or TPT/XF-1250 (see LONTERMINATOR Data Sheet TA200229).
IQLROUTER/24VAC	(not sold in US)	:Allows connection of two FTT LonWorks segments and routing of messages between them. It can reduce network traffic in selected channels. Includes optional terminator. 24 Vac input power.
IQLROUTER/230	(not sold in US)	:As above but with 230 Vac input power.
IQLROUTER/USA/UL/24VAC	882001300 (US only)	:Allows connection of two FTT LonWorks segments and routing of messages between them. It can reduce network traffic in selected channels. Includes optional terminator. 24 Vac input power.
TP/1/0/16/HF/200	(not sold in US)	:200 metres (218 yds) unscreened single twisted pair cable suitable for wiring LonWorks bus.

SPECIFICATIONS

Electrical

Supply	:24 Vac ±15%, 50/60 Hz
Power	:15 VA internal power, plus the power required by the triac outputs. This can be calculated by adding the power requirements of all triac outputs to the controller's 15 VA (see Input power, page 2). Due to UL requirements for Class 2 devices, the power source used to power the controller cannot exceed 100 VA.
CPU	:3150 Neuron 10 MHz
Memory	:48 kbytes Flash, 8 kbytes SRAM
Battery	:no battery required (data stored in flash memory)
Clock	:software clock (1 minute resolution)
LonWorks	:FTT - Free topology, 78 kbaud, transformer isolated. Single termination (RC network)
Lon OK LED	: (green) Flashes every 24 s during Lan build. ON indicates successful communication with other IQ system device on LonWorks. Flashes every 1 s indicates communications failure on LonWorks.
LonWorks FTT databus	:Maximum bus length, node to node distance depends on cable type.

Recommended Cables	Max bus length	Max node to node
Belden 85102	500 m (545 yds)	500 m (545 yds)
IQ System TP/1/0/16/HF/200 (Belden 8471)	500 m (545 yds)	400 m (430 yds)
UL Level IV, 22 AWG	500 m (545 yds)	400 m (430 yds)
JY(St) Y2 x 2 x 0.8	500 m (545 yds)	320 m (350 yds)
TIA568A Cat. 5, 24 AWG	450 m (490 yds)	250 m (270 yds)

Note that this does not include cable recommended for the IQ System current loop Lan.

Fuse :The input power is protected by a self-resetting thermal device. The 24 Vac input power to the triac outputs is protected by 6.3A thermal fuse.

Inputs

IN1 to IN4	:Universal (voltage, variable resistance, or digital) inputs. 10 bit resolution. Voltage input 0 to 5 V. Resistance 0 to 29 kΩ, Bridge supply 5 Vdc. Digital input volt free contact, 5 Vdc supply through 10 kΩ. Wetting current 0.5 mA
IN5	:Universal (voltage, variable resistance, or digital) or TBus input as set by on board link. Universal input as above (IN1 to IN4). TBus is serial input with maximum distance of 30 m (32 yds).
IN6	:Differential pressure sensor input. Calibrated to give 0 to 2 inwc (VAV/USA) or 0 to 500 Pa (VAV).
The following sources of error apply over the range 18 to 22 °C (64 to 72 °F), after local zero offset calibration adjustment (see differential pressure sensor section, page 4).	
zero offset error	:±0.5 Pa, 0.002 inwc (typical) ±4.0 Pa, 0.016 inwc (maximum)
span accuracy	0 to 300 Pa :±2.5 % (typical), ±5 % (maximum) 300 to 500 Pa :±10 % (maximum)
non-linearity	:±2.5% (maximum)
Outside 18 to 22 °C (64 to 72 °F) the following additional factors apply:	
zero offset error	:±0.033 Pa/°C, 0.0007 inwc/°F (typical) ±0.333 Pa/°C, 0.0007 inwc/°F (maximum)
span accuracy	:±0.0 %/°C, %/°F

Outputs

DO1 to DO5	:Triac outputs equivalent to 24 Vac solid state relays. Switch 24 Vac at up to 0.7 A. Triac output consumption should be added to IQLVAV power requirement.
DO6/DO7	:Damper Actuator output channels (channel 6, raise, channel 7, lower)
Damper Actuator	
Rated Torque	:35 in-lb (3.95 Nm)
Range of travel	:0 to 95 ° with adjustable mechanical stops
Rotation speed	:1.0 °/s nominal
Position resolution	:0.1 ° with a 1 ° minimum positioner movement
Actuator output Shaft	1.0 s minimum pulse duration :Accepts shafts ¼" to 5/8" (6.35 mm to 15.9 mm)
Manual Override	:pushbutton clutch
AO8	:Output channel not available

SPECIFICATIONS (continued)**Mechanical**

Dimensions	: 133.4 mm (5.25") x 225.3 mm (8.87") x 69.9 mm (2.75")
Material	:ABS Polycarbonate
Weight	
Controller	:820 g (29 oz)
Shipping	:1100 g (40 oz)
Connections	
Electrical	:5.0 mm (0.197") two part connectors for 0.35 to 2.5 mm ² (14 to 22 AWG) cable
Air pressure	:Push on barbs for 3/16" (4.75 mm) ID tubing
Actuator	:U clamp for 1/4" to 5/8" (6.35 mm to 15.9 mm) diameter shafts

Environmental

EMCEmissions	
Canada	:Complies with C108.8
EU	:EN61000-6-3:2001
US	:Complies with FCC Part 15
EMCImmunity(EU)	:EN61000-6-2:2001
Safety	
Canada	:CSA C22.2, No. 205-M1983, PAZX7.E90949, Listed - Signal Equipment CSA C22.2, No. 24-93, SDFY8.E1434292, Recognised - Temperature Indicating and - Regulating Equipment
EU	:EN61010:2001(Installation Category III-fixed installations)
US	:UL916, PAZX.E90949, Listed - Open Energy Management Equipment UL873, SDFY2.E1434292, Recognised - Temperature Indicating and Regulating Equipment
Ambient limits	
operating	:0 °C (32 °F) to +50 °C (122 °F)
humidity	:0 to 90 %RH non-condensing
Protection	:NEMA 1, IP20
Version	
firmware	:version 5.41 or later
board	:303023000 Rev 0

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