



techsystem

automatyka klimatyzacja wentylacja

▸ zapoznaj się z naszą ofertą

Integrated Room Control Solution with AD-IRC

The Integrated Room Control Solution provides the control of the heating, cooling, lighting and sunblinds within an occupied space, such as an office or small conference room, in one coordinated control system with a single point of control interface for the occupant.

The AD-IRC Integrated Room Controller is a LONWORKS® network compatible device that is the master device in the system. The AD-IRC provides direct digital control of a fan coil unit with heating and/or cooling coils, an electric heater and a three-speed fan. Alternatively it can control a chilled ceiling and heating radiators. It is mounted within the fan coil unit or other protective enclosure.

One or two zones of lighting in the space and optionally sunblinds are controlled by AD-IRL, AD-IRS and AD-ILS slave modules that can be mounted directly in the ceiling void.

The space comfort set point, occupancy mode and fan speed may be adjusted from the AD-IRM Integrated Room Command Module. From the same module the occupant can switch and adjust the lighting level and operate the sunblinds.

The controller complies with the LONMARK® interoperability guidelines for sharing data with other network sensors and devices. Operating data can be monitored and controlled from a LONWORKS compatible supervisory system, including the Metasys® NCM Network Control Module and NAE Network Automation Engine that connect the integrated room control system into a facility-wide building management network.



Figure 1: AD-IRM Integrated Room Command Module

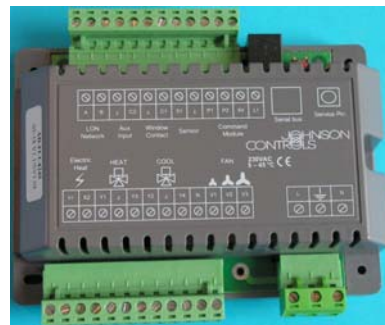


Figure 2: AD-IRC Integrated Room Controller



Figure 3: AD-IRL Integrated Lighting Control Module



Figure 4: AD-IRS Integrated Sunblind Control Module

Integrated Room Control (IRC) Solution

Features and Benefits	
<input type="checkbox"/> Single point of control for environmental comfort in the room for the occupants – temperature, lighting, sunblinds	User can control the environment from one integrated command module that avoids multiple, dissimilar control devices within the controlled space.
<input type="checkbox"/> Attractively styled wall-mounted room command module with back-lit digital display and control buttons for lighting and sunblind	Easy to use by building occupants under all lighting conditions.
<input type="checkbox"/> Modular configuration of hardware for HVAC, lighting and sunblind control with simple serial bus inter-connection	Flexible configuration options for different customer requirements to provide room environmental control at lowest installed cost.
<input type="checkbox"/> Each control module is separately powered by 230VAC	Maintains electrical power supply separation for HVAC, lighting and sunblind systems for installation and service. No additional transformers required.
<input type="checkbox"/> HVAC controller for FCU or chilled ceiling <ul style="list-style-type: none"> • Relay outputs at 230VAC 3A for direct fan control • Triac outputs at 230VAC or analog output at 0-10VDC for heating and cooling valve control • Relay output for electric heater control 	Low installed cost for a wide range of heating and cooling applications.
<input type="checkbox"/> Configuration and commissioning using any LonMark compatible LonWorks network or commissioning tool <input type="checkbox"/> All configuration parameters in LonMark network profile	Ease of configuration and commissioning – no special tool required.
<input type="checkbox"/> Multiple modes of operation for various occupancy conditions	Comfort with economy.
<input type="checkbox"/> Single point of interface from integrated room control system to LonWorks® network	Reduces cost of integrated control system within a room while providing open protocol communication and configuration between rooms and with other systems and operator stations in the building.
<input type="checkbox"/> LONMARK® Space Comfort Controller Profile	Interoperability with other LONMARK compliant devices.
<input type="checkbox"/> LONWORKS® network connection to Metasys network controller	Facility-wide monitoring, control and data sharing for cost-effective building operation with reduced energy usage.
<input type="checkbox"/> Standalone operation with default parameters <input type="checkbox"/> Nonvolatile memory (Flash and E²PROM)	System reliability independent of network communications and power interruptions.

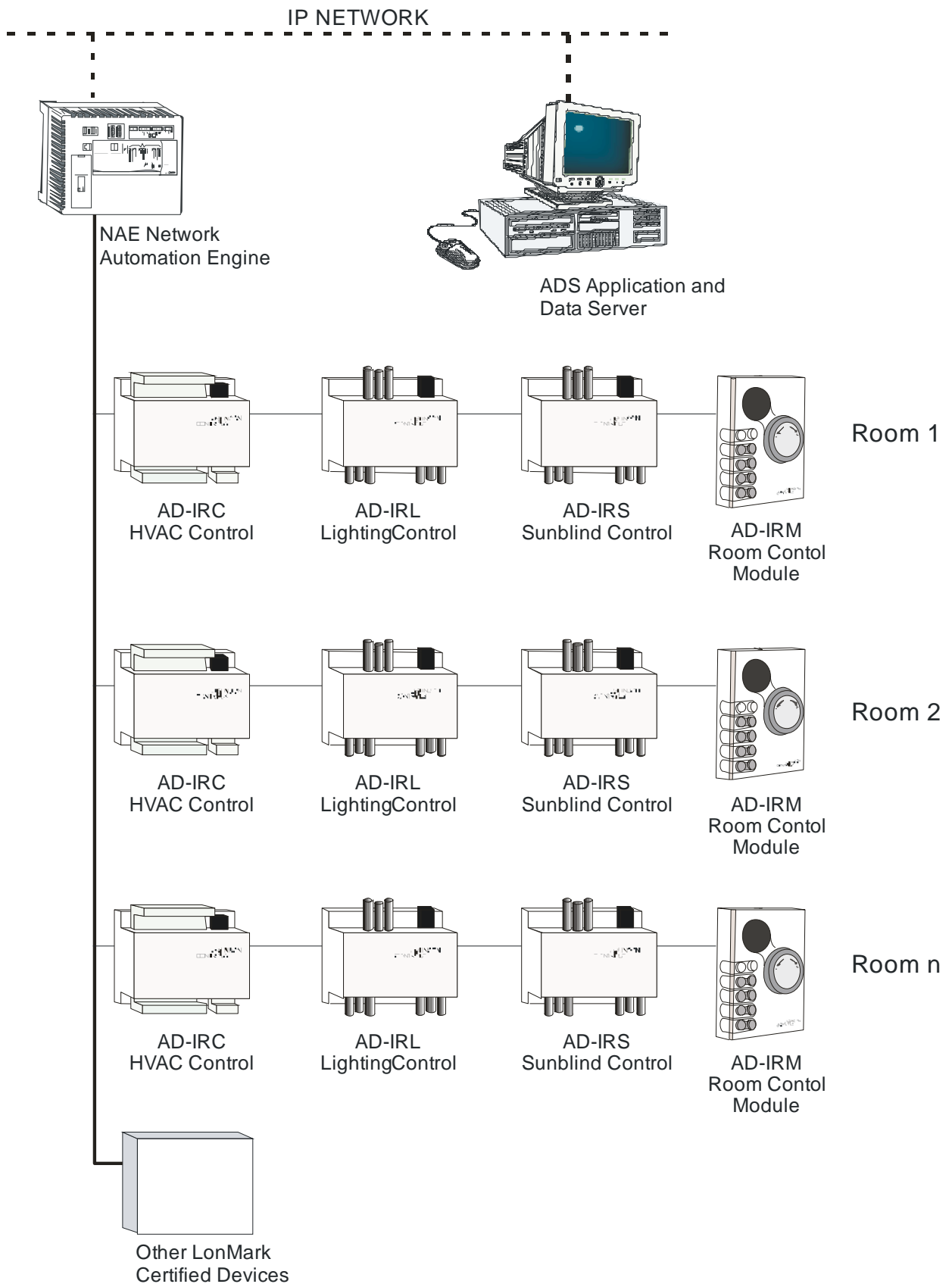


Figure 5: AD-IRC Integrated Room Controller in the Metasys Network

Configuration Options for Integrated Room Control

The integrated room control solution offers many configuration combinations for lighting and sunblind control in a room in addition to HVAC control with fan coil units, chilled ceilings or radiators.

For the room occupant, the Integrated Room Control Module (IRM) offers temperature control and fan speed override, two switched lighting zones and optionally one or two sunblind control zones.

The master HVAC controller (IRC) regulates a heating valve and a cooling valve, a fan with up to three speeds and an optional electric heater. The control action can be overridden by a window contact or condensation detector, and high and low temperature limits can be set for the discharge air of a fan coil unit.

The master HVAC controller (IRC) is also the point of connection of the integrated control system into the LonWorks® network.

With the slave control modules (IRL and ILS), up to four lighting output circuits are available, two of which may have the dimming function. One, three or four sunblind output circuits are also available (IRS and ILS).

The output circuits of the slave control modules (IRL, IRS, ILS) are assigned to the buttons on the Integrated Room Control Module (IRM) by LonWorks network configuration. Each button pair may be configured to control one or more output circuits as one zone.

A presence detector connected to the HVAC controller can be used to switch the lights on and/or off according to the room occupancy. **This function can be dependent on outside light level for zones adjacent to windows.**

The summary of the features of each module and the possible combinations are shown in Tables 1 and 2, and Figure 6 represents the overall system concept.

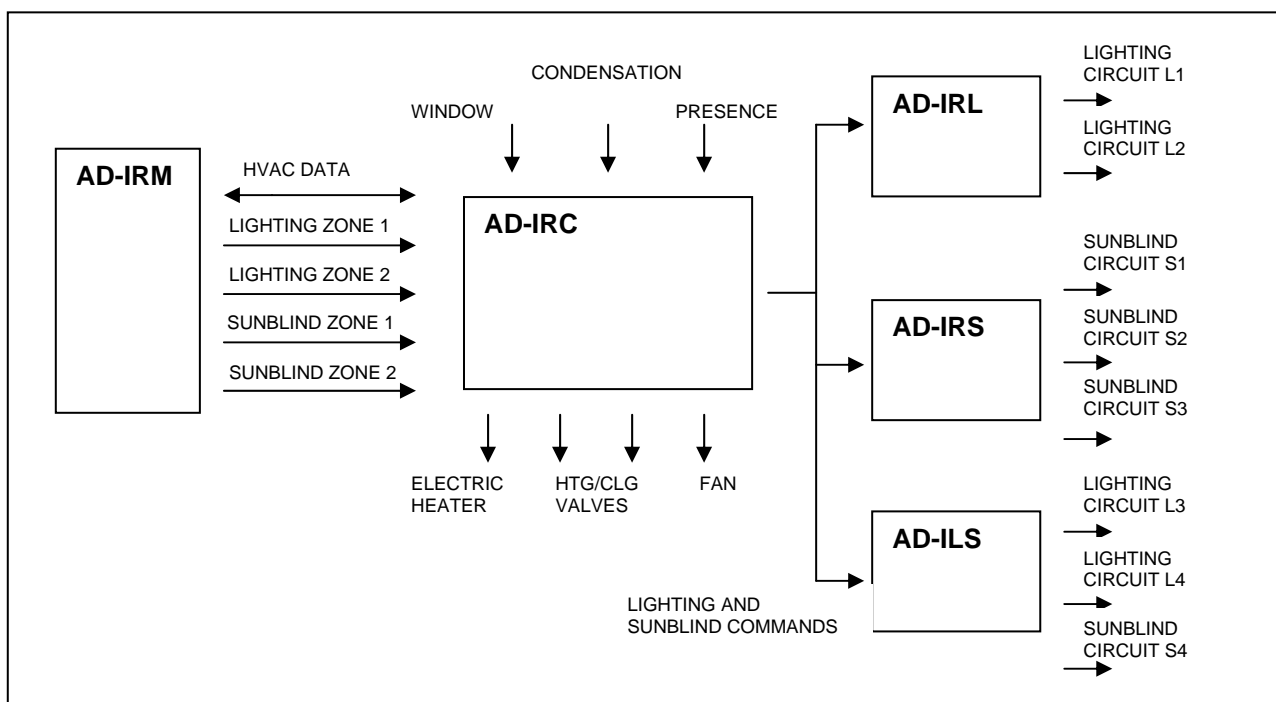


Figure 6: Integrated Room Control - Logical Concept Diagram

Table 1: Integrated Control Modules and Main Features

Module Description and Order Code	Main Features
<p>HVAC Master Controller</p> <p>AD-IRC4205-0 – analog outputs for heating and cooling</p> <p>AD-IRC4245-0 – PWM/DAO outputs for heating and cooling</p>	<ul style="list-style-type: none"> • Interface to LonWorks® network • Master to control modules on serial bus (one connector) • Heating and cooling control : Analog 0-10V actuators or PWM/DAO 230VAC thermal actuators • Fan control : 230VAC up to three speeds • Electric heater control : 230VAC 2kW PWM/DAO modulating • Window contact to save energy • Condensation detector to switch off cooling • Auxiliary temperature sensor for discharge air limit control • Presence detector for HVAC and/or lighting control • Outdoor light level input for override of lighting control on presence detection
<p>Lighting Control Module</p> <p>AD-IRL1025-0</p>	<ul style="list-style-type: none"> • Interface to serial bus (two connectors to make chain) • Two lighting circuits (L1, L2) : on/off, 230VAC 5A max.
<p>Lighting Control Module</p> <p>AD-IRL2025-0</p>	<ul style="list-style-type: none"> • Interface to serial bus (two connectors to make chain) • Two lighting circuits (L1, L2) : on/off and dimming, 230VAC 5A max.
<p>Sunblind Control Module</p> <p>AD-IRS1035-0</p>	<ul style="list-style-type: none"> • Interface to serial bus (two connectors to make chain) • Three sunblind circuits (S1, S2, S3) : up/down, 230VAC 3A max.
<p>Combination Lighting/Sunblind Module</p> <p>AD-ILS1035-0</p>	<ul style="list-style-type: none"> • Interface to serial bus (two connectors to make chain) • Two lighting circuits (L3, L4) : on/off, 230VAC 5A max. One sunblind circuit (S4) : up/down, 230VAC 3A max.
<p>Room Command Module</p> <p>AD-IRM1005-0 - HVAC only (lighting and sunblinds switched by other network devices)</p> <p>AD-IRM1015-0 – 2 lighting zones</p> <p>AD-IRM1025-0 – 2 lighting zones and 1 sunblind zone</p> <p>AD-IRM1035-0 – 2 lighting zones and 2 sunblind zones</p>	<ul style="list-style-type: none"> • Interface to serial bus (one connector – end of line) • Display of setpoint, space temperature, fan speed override • Setpoint adjust dial, occupancy and fan speed override buttons • Two button pairs for lighting zone control - on/increase and off/decrease (not AD-IRM1005-0) • None, one or two button pairs for sunblind zone control – up and down • Back-lit button pairs that can be seen when room is dark

Table 2: Typical Combinations of Modules for Integrated Room Control

oom Command Module Code	Lighting Control Zones	Sunblind Control Zones	Slave Control Module Options			Output Circuits		
			Slave 1	Slave 2	Slave 3	Lighting		Sun Blind
						on/off	on/off + dimming	
AD-IRM1015-0	2	-	AD-IRL1025-0	-	-	2		
AD-IRM1015-0	2	-	AD-IRL2025-0	-	-		2	
AD-IRM1015-0	2	-	AD-IRL1025-0	AD-ILS1035-0	-	4		
AD-IRM1015-0	2	-	AD-IRL2025-0	AD-ILS1035-0	-	2	2	
AD-IRM1025-0	2	1	AD-ILS1035-0	-		2		1
AD-IRM1025-0	2	1	AD-IRL1025-0	AD-ILS1035-0	-	4		1
AD-IRM1025-0	2	1	AD-IRL2025-0	AD-ILS1035-0	-	2	2	1
AD-IRM1035-0	2	2	AD-IRL1025-0	AD-IRS1035-0		2		3
AD-IRM1035-0	2	2	AD-IRL2025-0	AD-IRS1035-0			2	3
AD-IRM1035-0	2	2	AD-IRL1025-0	AD-IRS1035-0	AD-ILS1035-0	4		4
AD-IRM1035-0	2	2	AD-IRL2025-0	AD-IRS1035-0	AD-ILS1035-0	2	2	4

Lighting and Sunblind Control Options

Each integrated room control system offers the control of lighting in two zones and the option of sunblind control in one or two zones.

This corresponds with the normal office lighting installation with the lights near the windows in one zone and the other lights in another zone. Sunblinds on one building face are normally controlled together and the second zone can be used in the corner office that has sunblinds on two building faces.

The system supports four lighting circuits and four sunblind circuits that can each be assigned to any one of the two lighting or two sunblind control zones using the LonWorks network configuration. This means that interconnections can be made between systems to make efficient use of all available output circuits in adjacent lighting or sunblind control zones.

Two of the four lighting outputs may support the dimming function for variable lighting intensity.

Occupancy Comfort with Economy

The fan coil unit controller offers three modes of operation - occupied (comfort), standby (temporarily unoccupied) and unoccupied (night and weekends). These occupancy modes can be set from an operator workstation or network controller on a Metasys network, from another device on the LONWORKS network.

The AD-IRM room command module provides the occupant with set point and fan speed control, and a button to request a time-limited occupied mode for comfort conditions at night and weekends. Set point adjustment can be limited within a certain range to allow occupants control over their environment, but not to compromise energy savings. The current setpoint, space temperature and fan override status are shown on the digital display.

The occupant can also switch the space lighting from the room command module and adjust the lighting level when the light dimming option has been installed. With sunblind control the occupant can select the most comfortable combination of natural light and internal lighting with regard to the position and strength of solar radiation. The lighting and sunblind positions may also be set from the supervisory network.

With an optional presence detector in the space the lights can be configured to automatically switch on as an occupant enters the room and to switch off when the space is unoccupied.

In rooms with windows, the switching can be

dependent on the outside light level when a light sensor is connected to the LONWORKS network.

A “window open” sensor may be connected to the controller to switch it to the “Energy Hold-off” mode to avoid energy waste. The controller may also be set to “off” by the supervisory network when the space is not in use.

Where there are multiple fan coil units in a room, the controllers may be configured on the LONWORKS network to operate in master/slave mode to control the temperature in the space in unison. The same principle applies to the parallel operation of lighting zones and sunblinds.

For applications where the cooling coil or pipes are located in the ceiling, a condensation sensor may be connected to switch off cooling if water is condensing on the pipes.

Every controller has a low space temperature detection function as a standard feature that switches on the heating to the maximum value in “Emergency Heat” mode, overriding any other automatic or manual mode of the controller except safety interlocks.

For the best temperature comfort control the space sensor may be located in the room command module or in the fan coil unit, and an additional sensor can be mounted in the fan coil unit to limit the air discharge temperature to avoid uncomfortable hot or cold air currents in the room.

Fan Coil Unit Types

The controller may be configured to control fan coil units with a single water coil (2 pipe) or with separate heating and cooling coils (4 pipe). Two pipe fan coil units may be controlled as heating or cooling only, or may be configured to change control from heating to cooling depending on an external change-over signal from a hardware input contact or a network command.

When an electric heater is installed, the heater may be configured as the heat source in a two pipe fan coil unit with only a chilled water supply or as supplemental heat in a 2 pipe fan coil unit with a hot water supply or a 4 pipe fan coil unit in heating mode. The AD-IRC controller may also be used to control electric heaters with and without a forced air fan.

Fan Control Options

The controller may be configured to control a single-speed, two-speed or three-speed fan. The controller may also be configured to run the fan only when heating or only when cooling. Options are also available to keep the fan running continuously at low speed in occupied mode (or in all modes) or to allow the fan to cycle on and off as the space temperature

reaches the given setpoint. The fan speed override command is only active when the space is occupied and when there is no “Energy Hold-off” in order to save energy consumption. If the fan is forced to off mode, the electric heater control is de-activated and the fan continues to run at low speed for a short time to prevent overheating in the fan coil unit.

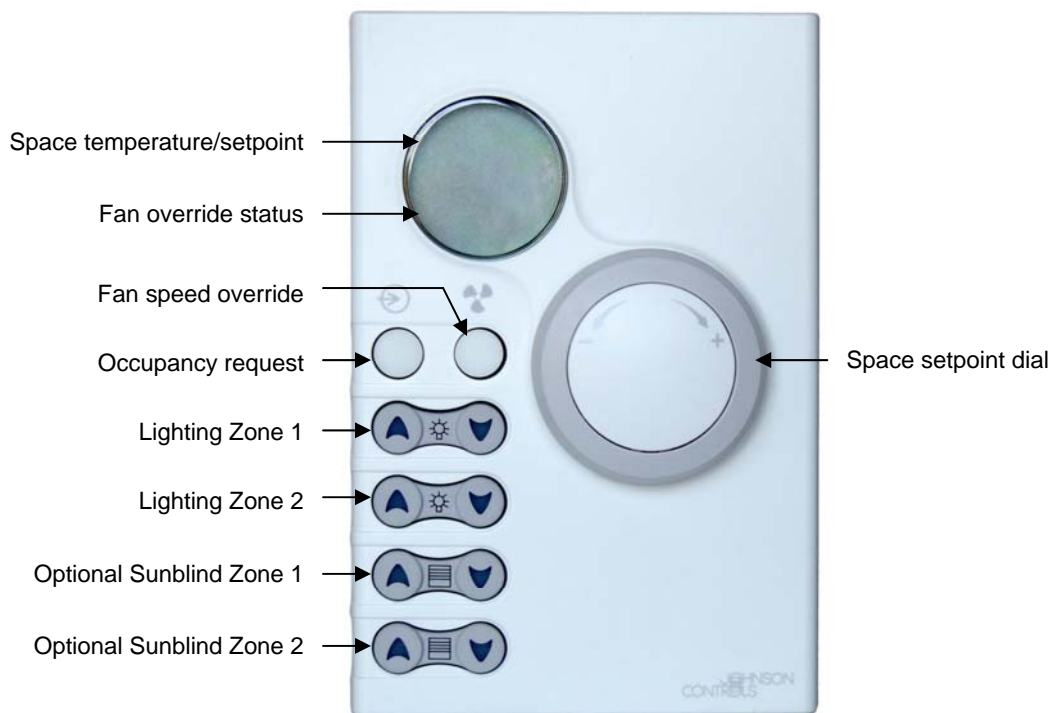
Integrated Room Command Module

The integrated room command module provides a single point of temperature, lighting and sunblind control for the occupants of the controlled space. All models have a temperature setpoint dial and buttons to override the fan speed and to request comfort mode for a limited period of time when the system has been set to unoccupied mode.

The display can be configured to normally show the space temperature and the space setpoint whenever the setpoint dial is being moved. Alternatively only the space setpoint may be shown. The lower part of the display shows the fan override status and will be blank if the system does not control a fan.

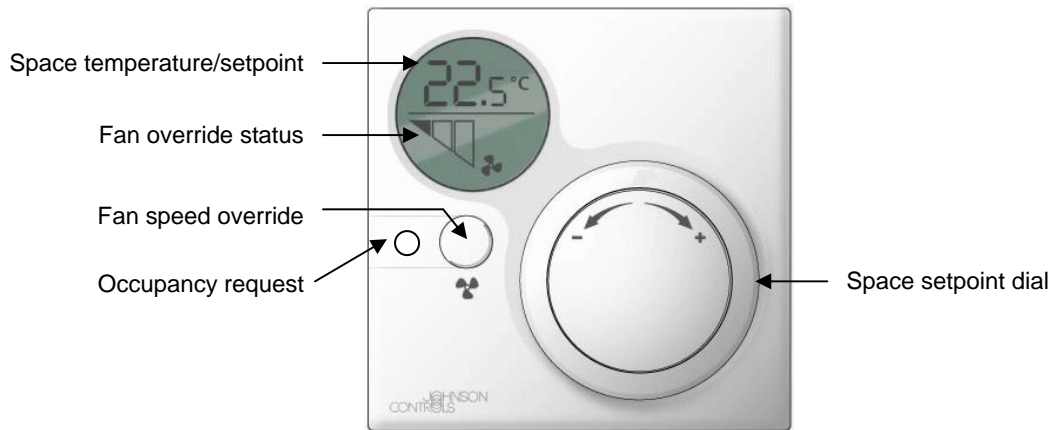
All models except the AD-IRM1005-0 also have two sets of lighting zone control buttons and models are available with one or two sunblind zone control buttons. Unused positions are filled with a blank insert. All these control buttons are back-lit to enable the occupant to see the position of the buttons when the room is dark and to switch on the lights or open the sunblinds. The operation of the buttons is very intuitive for switching lights on and off, increasing and decreasing lighting intensity and for raising and lowering sunblinds.

The function and position of the controls on the integrated room command module are shown in Figures 7 and 8.



Note: Any movement of the fan speed override button or space setpoint dial also sends an occupancy request when the connected controller is not already in OCCUPIED mode.

Figure 7: Integrated Room Command Module AD-IRM10x5-0



Note: Any movement of the fan speed override button or space setpoint dial also sends an occupancy request when the connected controller is not already in OCCUPIED mode.

Figure 8: Room Command Module AD-IRM1005-0

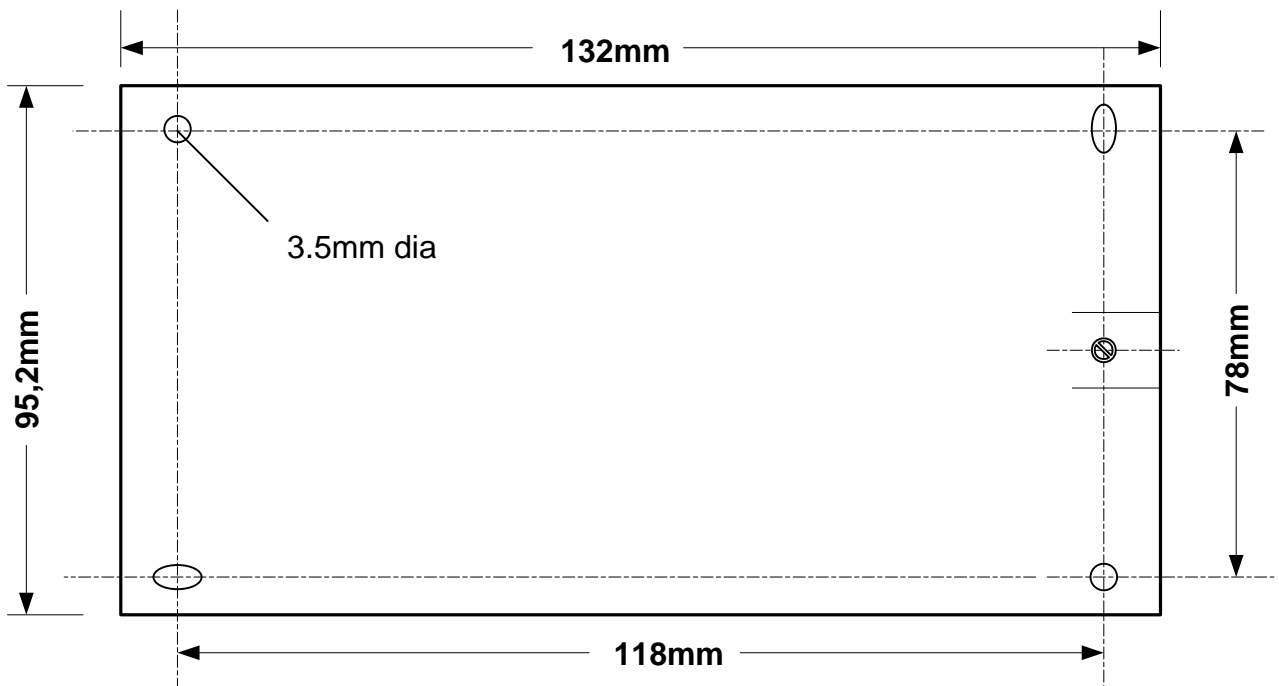


Figure 9: AD-IRC Fan Coil Unit Controller, Lighting Control and Sunblind Control Modules Mounting Details

Installation Instructions

General

The mounting location must be clean and dry, and not subject to extreme heat or cold. The installation and electrical wiring must conform to local codes and should be carried out by authorized personnel only. Users should ensure that all Johnson Controls' products are used safely and without risk to health or property.

For direct surface mounting, place the control module at the desired position and mark the location of at least two mounting holes. For metal and wood surfaces drill small guide holes for self-tapping screws. For masonry surfaces drill holes and insert plugs. Fix the controller to the surface using 3mm diameter screws. If the surface is uneven, use spacers to avoid straining and breaking the plastic enclosure. See Figure 9 for mounting details.

For DIN rail mounting, place the control module on the lower edge of the rail and press the controller upwards against the spring-loaded retaining clip and engage onto the upper edge of the rail. To remove the controller, lift the controller upwards against the spring-loaded retaining clip and pull forward from the top.

Local electric codes must be respected for wire size and external protection fuses. No over-current protection is provided within the control modules for the 230VAC control outputs.

Complete and verify all wiring connections before setting the control modules into operation.

AD-IRC Controller


The AD-IRC controller is typically mounted in the fan coil unit enclosure or in an electrical cabinet in the space being controlled.

Before connecting or disconnecting any wires to the controller, ensure that all power supplies have been switched off and all wires are potential-free to prevent equipment damage and avoid electrical shock. Terminations are made on the terminal blocks, at the top and bottom of the controller, which accept up to 1.5 mm² / 16 AWG wires. Follow the wiring diagram shown in Figure 11. Use a minimum wire size of 0.8 mm / 20 AWG for sensor connections, and size other wires according to the current load.

If multi-stranded wire is used for 230 VAC connections, a metal sleeve must be crimped onto the exposed metal strands before inserting the wire into the terminal.

Keep all wires and cables as short as possible and tie in position or lay them in cable guides. It

is recommended that sensors and actuators are mounted within 15 m of the controller. Do not mount the controller or run any low voltage cables close to transformers, line voltage cables or high frequency generating equipment.

Connect the earth/ground terminal (labeled ) to a clean electrical ground point. This connection provides a discharge path for any high voltage interference that could otherwise damage the controller or the LONWORKS network. Do not connect the LonWorks network cable shield (if installed) to the controller's earth/ground terminal.

The LonWorks network wiring must be installed in accordance with the LonMark Guidelines for the "Free Topology" physical layer of the network. If shielded cable is used, install a 470 kOhm, 1/4 W, ±10% metal-film resistor between the shield and a clean electrical ground point at one accessible location only (normally at the LonWorks network tool location or supervisory station).

AD-IRL, AD-ILS, AD-IRS Control Modules

The lighting and sunblind control modules are typically mounted in the ceiling area, close to the lighting fixtures or sunblind drives. Electrical connections are made using the specified Wieland connectors and shown in Figures 12 to 15 and Table 3. Use wire sizes appropriate for the load and follow the manufacturer's instructions for the assembly and installation of the cables and connectors.

AD-IRM Room Command Module

The room command module is designed for flush mounting over an electrical outlet in the wall next to the entry point into the space for operation of the lighting buttons when it is dark. The internal temperature sensor may be used for control if the temperature at this location is typical for the controlled space and is not subject to radiant heat from a window or air currents from a fan or from the entry point. Otherwise consider mounting a temperature sensor in the fan coil unit or other suitable location for space temperature measurement. Refer to Figure 10 for mounting details.

Serial Bus Cabling

The serial bus cables must be assembled with cable lengths as required by the installation. Details are shown in Figures 16 and 17. Note that the total serial bus cable length must not exceed 12m.

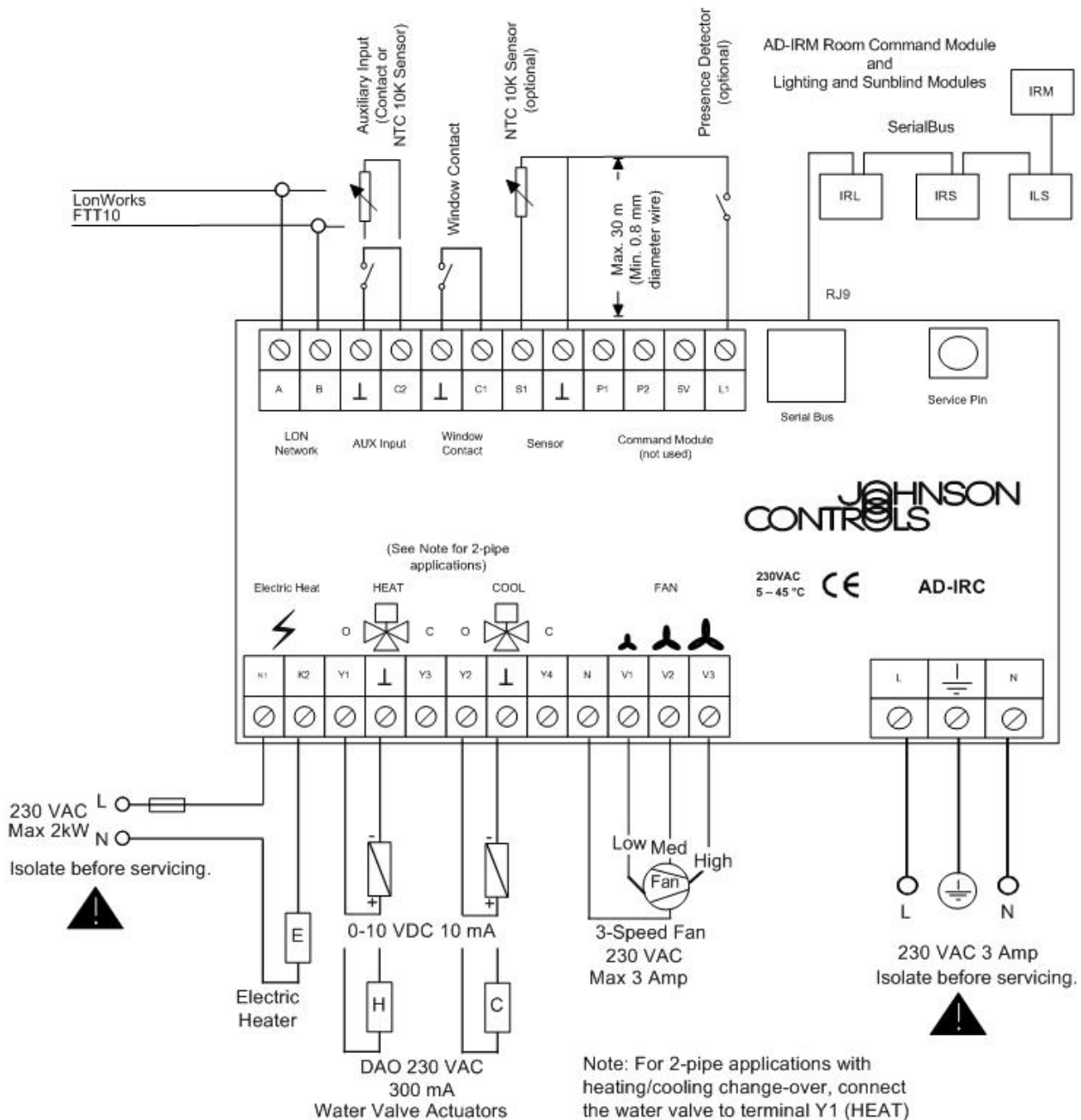


Figure 11: AD-IRC Fan Coil Unit Controller Wiring Details

WARNING: Connections to the fan control terminals may carry up to 250 VAC. Isolate live and neutral supply lines (requires use of double-pole isolator switch) before servicing.

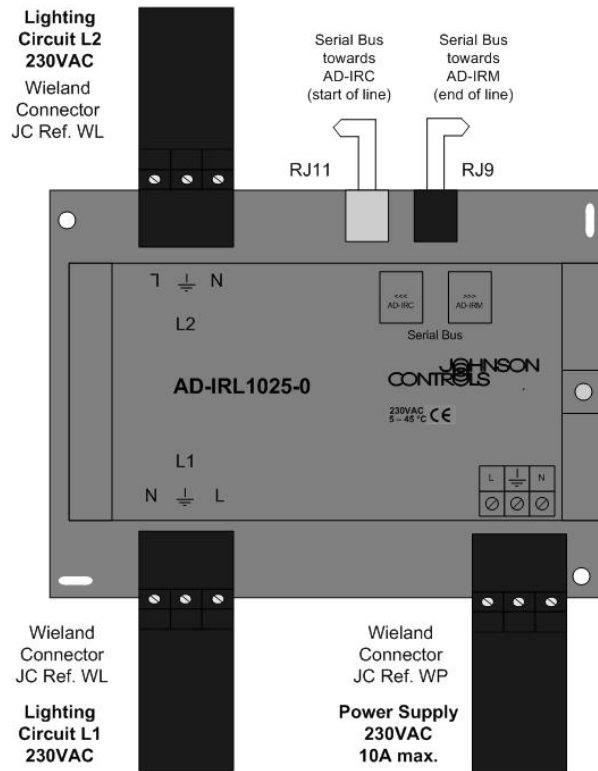


Figure 12: AD-IRL1025-0 Integrated Lighting Control Module Connection Details

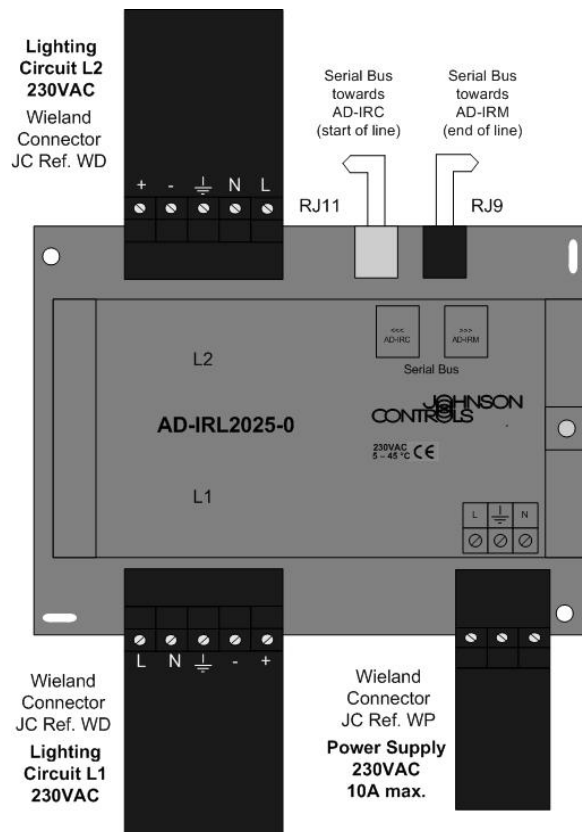


Figure 13: AD-IRL2025-0 Integrated Lighting Control Module Connection Details

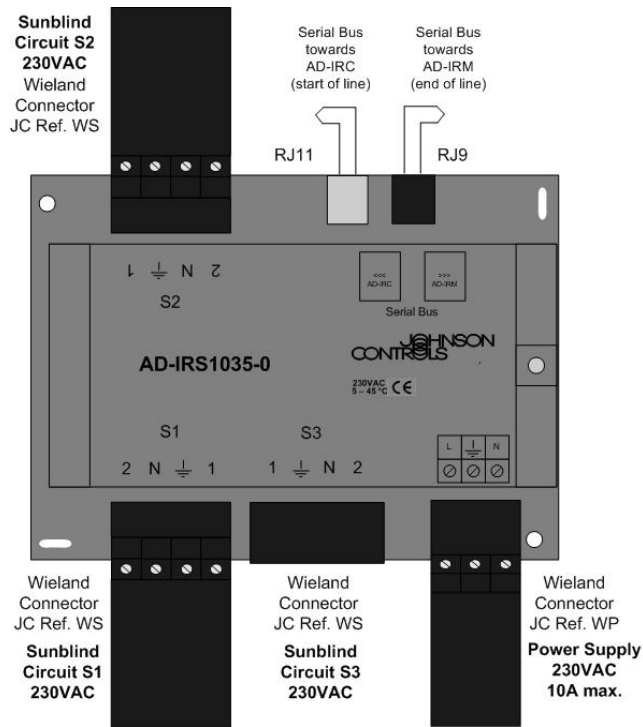


Figure 14: AD-IRS1035-0 Integrated Sunblind Control Module Details

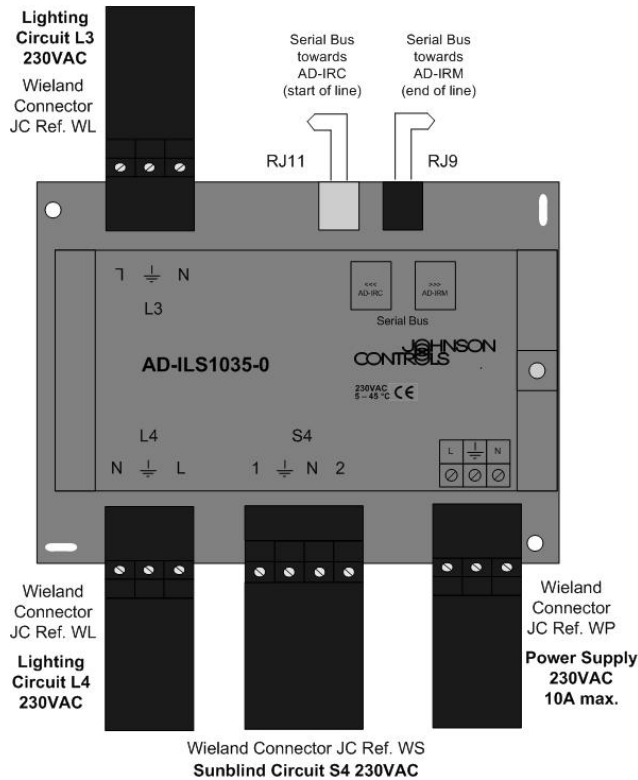


Figure 15: AD-ILS1035-0 Integrated Lighting and Sunblind Control Module Details

Table 3: Wieland® Connector and Cable References

Circuit Type	JC Ref.	Wieland Reference	Wieland Connector Description
Power 230VAC	WP	92.933.0053.1	GST 18/3, 3-pin, female, screw connections
Lighting on/off	WL	92.932.3053.1	GST 18/3, 3-pin, male, screw connections
		92.232.xx.00.1	Connector with xx meter of 3-core cable
Lighting with dimming	WD	92.954.3453.0	GST 18/5, 5-pin, male, screw connections
		92.257.xx.00.9	Connector with xx meter of 5-core cable
Sunblind	WS	92.944.0053.1	GST 18/4, 4-pin, male, screw connector
		92.207.xx.00.1	Connector with xx meter of 4-core cable

Note: Contact your local Wieland® Distributor for details of the complete range of cable and accessories for the installation of power and control wiring for lighting and sunblinds.

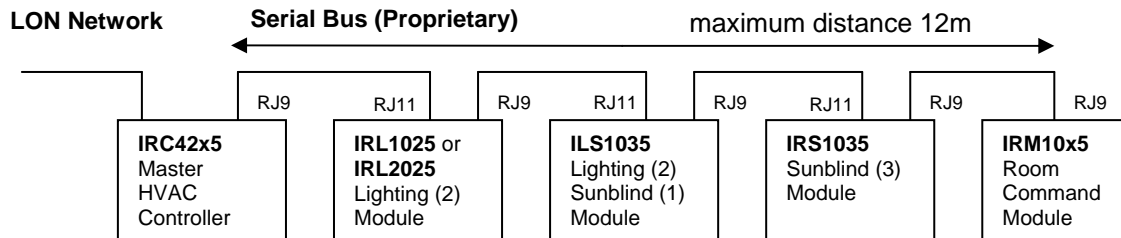
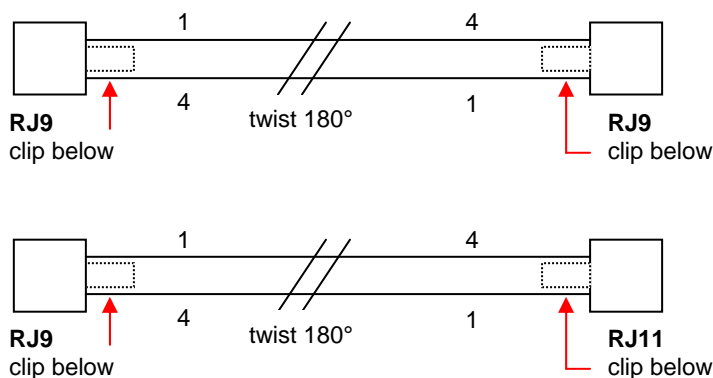


Figure 16: IRC master controller and slave modules on the serial bus (maximum configuration)



Use **RJ9 – RJ9** to connect serial bus from AD-IRM to any other module: AD-IRC, AD-IRL, AD-IRS, AD-ILS (AD-IRCBL99S-0 or AD-IRCBL99L-0)

Use **RJ9 – RJ11** to connect serial bus from any module to any other module: AD-IRC, AD-IRL, AD-IRS, AD-ILS (AD-IRCBL911S-0 or AD-IRCBL911L-0)

Cable: 4 wire flat cable 7/0.16mm (26AWG). Maximum 12m for one complete serial bus from AD-IRC.

Figure 17: Serial Bus Cable Assembly

Table 4: Connector Kits and Serial Bus Cables

Order Code	Description
AD-IRL1025CK-0	Connector Kit for AD-IRL1025-0 (WP + 2 x WL)
AD-IRL2025CK-0	Connector Kit for AD-IRL2025-0 (WP + 2 x WD)
AD-IRS1035CK-0	Connector Kit for AD-IRS1035-0 (WP + 3 x WS)
AD-ILS1035CK-0	Connector Kit for AD-ILS1035-0 (WP + 2 x WL + WS)
AD-IRCBL911S-0	Serial bus cable RJ9 to RJ11 – Length 30cm
AD-IRCBL911L-0	Serial bus cable RJ9 to RJ11 – Length 6m
AD-IRCBL99S-0	Serial bus cable RJ9 to RJ9 – Length 30cm
AD-IRCBL99L-0	Serial bus cable RJ9 to RJ9 – Length 6m
AD-IRCKJ09-0	Connectors RJ9 - Pack of 50
AD-IRCKJ11-0	Connectors RJ11 - Pack of 50

Note: Serial bus cables for site installation are normally fabricated according to the length required unless the 6m cables are suitable. Fold back unused cable lengths over the maximum distance possible and do not tightly coil unused cable lengths in one location. Serial bus cable and a tool for attaching the RJ9 and RJ11 connectors are available from local electronics and telecommunications components stockists. Contact your local Johnson Controls office if you have difficulty in obtaining cable or a tool.

Convenient Configuration Setup

The application software is pre-loaded and the control modules are delivered with factory-set configuration **parameters**.

All network variables and configuration parameters (or properties) may be accessed using any LonMark compatible network configuration tool. Configuration properties such as occupancy mode set points, control sequence type and control loop tuning constants can be modified. Lighting and sunblind output circuits of the slave control modules can be assigned to the control zones of the AD-IRM room command module by binding network

variables within the AD-IRC master controller. Network variables provide online operating data for the verification and testing of the control sequence.

Once configured, commissioned, and connected to a network, the controller may be monitored from a Metasys operator workstation or other LONWORKS compatible supervisory device.

As the controller is fully LONMARK compliant, it may be connected to any LONWORKS network and configured to communicate with other devices on the network using any LONMARK compatible network configuration tool.

Network Variables and Configuration Properties

The following tables list the network variables that are available in the controller for monitoring by LonWorks compatible supervisory systems and for binding to other LonMark compliant devices using a LonWorks network configuration tool. The configuration properties are also listed. A limited number of properties may be monitored by a supervisory system as network variables, but all can be read and set by a LonMark network tool with the appropriate communication capabilities and controller

configuration data base information or resource files. For details of system and network configuration procedures, refer to the technical documentation of the system and tools which are to be used.

For further details of the controller configuration options **and the factory default values for configuration parameters**, refer to the *Configuration Guide – AD-FCC, AD-FCD, AD-IRC*.

Networking Capabilities

Your facility will benefit even more when the integrated room control system is connected into a larger Metasys network. The AD-IRC master controller can be connected to a LONWORKS network that is monitored by a Metasys Network Control Module (NCM) or Network Automation Engine (NAE) that can be programmed to provide added energy management and supervisory control capabilities, such as optimal start, trend log, run-time totalization, and more.

The Metasys networking features make information from each integrated control system available throughout the facility. This makes it possible, for example, to reset supply water temperatures based on the load demands of the rooms, and to adjust the room set points based on an outdoor air temperature for the building or for each zone of the building. The Metasys system also makes sensor values, operating status, and any other values in the control system available to operators at Metasys workstations anywhere in your facility.

Open Communications and Interoperability with LONWORKS

When this integrated room control system is installed in one or more rooms in your building, the LONWORKS communication capability means that each system can be integrated into a LONWORKS network in your facility at any time. LONWORKS is an open standard for field communications, and interoperability with other

LONWORKS compatible devices is assured by the LONMARK Interoperability Guidelines. Using the LONWORKS technology in the Metasys system allows you to integrate third party LonMark certified controllers and devices into the facility-wide management system.

Table 5: Temperature Controller Network Variable Inputs

Description	SNVT Name	SNVT Type
Space Temperature Input	nviSpaceTemp	SNVT_temp_p
Space Temp. Setpoint (Absolute)	nviSetpoint	SNVT_temp_p
Space Setpoint Offset (for synchronization of multiple controllers)	nviSetptOffset	SNVT_temp_p
Occupancy Mode Command	nviOccManCmd	SNVT_occupancy
Occupancy Input (for synchronization of multiple controllers)	nviOccSensor	SNVT_occupancy
Application Mode Input	nviApplicMode	SNVT_hvac_mode
Fan Speed Command (auto, off, 1, 2, 3)	nviFanSpeedCmd	SNVT_switch
Energy Hold Off (window open)	nviEnergyHoldOff	SNVT_switch
Heating/Cooling Changeover Command (2 pipe configuration)	nviChangeOver	SNVT_switch
Input for Multiple Window Interlock	nviWindowLoop	SNVT_switch
Enable Power Limit for Electric Heater	nviEconEnable	SNVT_switch

Table 6: Temperature Controller Network Variable Outputs

Description	SNVT Name	SNVT Type
Space Temperature	nvoSpaceTemp	SNVT_temp_p
Controller Unit Status (Applic. Mode, Heat Output, Elect. Heater, Cool Output, Fan Status)	nvoUnitStatus	SNVT_hvac_status
Effective Setpoint	nvoEffectSetpt	SNVT_temp_p
Effective Occupancy Mode	nvoEffectOccup	SNVT_occupancy
Effective Heat/Cool Mode	nvoHeatCool	SNVT_hvac_mode
Local Setpoint Offset (for synchronization of multiple controllers)	nvoSetptOffset	SNVT_temp_p
Fan Speed Output	nvoFanSpeed	SNVT_switch
Effective Fan Speed Command	nvoFanSpeedCmd	SNVT_switch
Auxiliary Temperature Sensor (connected to auxiliary input)	nvoAuxSensor	SNVT_temp_p
Heating Output	nvoHeatPrimary	SNVT_lev_percent
Cooling Output	nvoCoolPrimary	SNVT_lev_percent
Energy Hold-off Status	nvoEnergyHoldOff	SNVT_switch
Window Open Sensor	nvoWindow	SNVT_switch
Auxiliary Contact (occupancy, heat/cool change-over or condensation sensor by configuration)	nvoAuxContact	SNVT_switch
Run Time of Electric Heater in Hours	nvoHeaterRunTime	SNVT_count

SNVT: Standard Network Variable Type

Refer to *LONMARK Interoperability Guidelines* for further details.

Table 7: Temperature Controller Configuration Properties

Description	SCPT Name	Data Type
Space Temperature Setpoints (configured as network variable)	nciSetpoints	SNVT_temp_setpt
Temporary Occupied Time (IRM Occup. button) (configured as network variable)	nciBypassTime	SNVT_time_min
Proportional Band of Control Loop	nciPropBand	SNVT_temp_p
Integral Action Time of Control Loop	nciIntTime	SNVT_time_sec
Space Temperature Low Limit	nciSpaceLowLimit	SNVT_temp_p
Space Temperature Sensor Offset	nciOffsetTemp	SNVT_temp_p
Setpoint Offset Command Value Range (value = +/- IRM Setpoint Range)	nciOffsetStep	SNVT_temp_p
Send Heartbeat	nciSndHrtBt	SNVT_time_sec
Receive Heartbeat	nciRcvHrtBt	SNVT_time_sec
Fan Coil Unit Type (2 or 4 pipe, electric heater)	nciCfgFcc.FccType	UCPT_CfgFcc
Heat and Cool Valve DAO Cycle Time (sec.)	nciCfgFcc.ValveCycleDur	
Electrical Heater DAO Cycle Time (sec.)	nciCfgFcc.ElecCycleDur	
Fan Control Mode (neutral zone, heat, cool)	nciCfgFcc.FanOp	
Room Module Type (defines IRM as room module)	nciCfgFcc.RoomModuleType	
Space Temperature Sensor Select (unit mount sensor or IRM sensor)	nciCfgFcc.SensorSelect	
Integrated Room Module Display Definition (space temp/setpoint/fan status)	nciCfgFcc.TempDisplay	
Auxiliary Contact (occupancy, heat/cool change-over, condensation or temp. sensor)	nciCfgFcc.AuxContact	
Fan Over-run Time in OFF status (sec.)	nciCfgFcc.FanOffDelay	
Window Contact (always closed, NC, NO)	nciCfgFcc.Window	
Fan Speed Levels (start level for speeds 1, 2, 3)	nciCfgFan	UCPT_CfgFan
Parameters for Discharge Air Control (Auxiliary Contact = Temperature Sensor) Control Type (none, high and/or low limit) Proportional Band for Control Discharge Air Low Limit Discharge Air High Limit	nciDischAir nciDischAir.Type nciDischAir.PropBand nciDischAir.LowLimit nciDischAir.HighLimit	UCPTdischAir
Heat/Cool Output Type (DAO/Ana or PAO)	nciCfgIrc.ValveType	UCPT_CfgIrc
Heat Valve PAO Full Travel Time (sec.)	nciCfgIrc.HeatValveTime	
Cool Valve PAO Full Travel Time (sec.)	nciCfgIrc.CoolValveTime	
Define Input L1 as Presence Detector	nciCfgIrc.L1Cfg	
Back Light Time-out IRM Display (sec.)	nciIrmBackLight	UCPT_IrmBackLight

SNVT: Standard Network Variable Type SCPT: Standard Configuration Property Type

UCPT: User-defined Configuration Property Type

Refer to *LONMARK Interoperability Guidelines* for further details.

Table 8: Command, Lighting and Sunblind Module Network Variable Inputs and Outputs

Description	SNVT Name	SNVT Type
Override Command for Lights and Sunblinds	nviOverrideCmd	SNVT_setting Lighting: SET_OFF, SET_ON Dimming: SET_STATE Sunblinds: SET_DOWN, SET_UP
Command Module Lighting Zone 1	nvoCmdLum1	SNVT_setting
Command Module Lighting Zone 2	nvoCmdLum2	SNVT_setting
Command Module Sunblind Zone 1	nvoCmdSBlind1	SNVT_setting
Command Module Sunblind Zone 2	nvoCmdSBlind2	SNVT_setting
Presence Detector Output	nvoPresence	SNVT_occupancy
For Lighting Modules: (maximum 4 outputs, maximum 2 with dimming):		
Lighting Command for Output Lx	nviLumx (x = 1 .. 4)	SNVT_setting
Effective Lighting Cmd Output Lx	nvoLumx (x = 1 .. 4)	SNVT_setting
For Sunblind Modules: (maximum 4 outputs):		
Sunblind Command for Output Sx	nviSunBlindx (x = 1 .. 4)	SNVT_setting
Effective Sunblind Cmd Output Sx	nvoSunBlindx (x = 1 .. 4)	SNVT_setting
Outdoor Lighting Level Sensor	nviLuxLevel1	SNVT_lux

Table 9: Command, Lighting and Sunblind Module Configuration Properties

Description	SCPT Name	Data Type
Maximum Sunblind Travel Time (maximum up or down travel time)	nciSBlindTime	SNVT_time_sec
Effective Dimming Range -% input signal	nciLumRange	UCPTlumRange
Presence Detection Off Delay	nciPresenceDelay	SNVT_time_sec
Configuration of Lighting Zone 1 and 2 for Presence Detection	nciLumCmdPres	UCPT_LumCmdPres
Outside Light Level Setpoint (differential)	nciLumSetpt	SNVT_lux
Outside Light Level Setpoint	nciLumLevelPres	SNVT_lux
For Lighting Modules: (maximum 4 outputs, maximum 2 with dimming):		
Configuration of Lighting Output Lx (on/off or dimming with range)	nciCfgLumx (x = 1 .. 2)	UNVT_cfgLum

SNVT: Standard Network Variable Type SCPT: Standard Configuration Property Type
UCPT: User-defined Configuration Property Type

Note: The LonMark Resource File API must be at Version 2.3 or later. (An update is available from the LonMark Web site.)

Refer to *LONMARK Interoperability Guidelines* for further details at www.lonmark.org .

Specifications and Technical Data

AD-IRM Series Integrated Room Command Modules and Temperature Sensors

Product Order Codes	<i>Room Command Modules</i>
	Note: All IRM models have LCD display of space temperature, setpoint and fan speed, setpoint dial, fan speed select and occupancy request buttons.
	<i>AD-IRM1005-0 IRM with HVAC controls only</i>
	AD-IRM1015-0 IRM with 2 x Lighting Zone Control Buttons
	AD-IRM1025-0 IRM with 2 x Lighting Zone + 1 x Sunblind Zone Control Buttons
	AD-IRM1035-0 IRM with 2 x Lighting Zone + 2 x Sunblind Zone Control Buttons
	<i>Temperature Sensor only</i>
	TE-9100-8502 Unit Mount NTC 10k Temperature Sensor
Supply Voltage	Powered from AD-IRC Controller Serial Bus
Ambient Operating Conditions	5° to 40°C 10 to 90% RH Noncondensing
Ambient Storage Conditions	-20° to 70°C 10 to 95% RH Noncondensing
Housing	Material: ABS + polycarbonate, UL94VO rated. Protection: IP30 (IEC529)
Mounting	Direct surface mount., plastic base for surface mount with wiring conduits, recessed wall box-, and panel mounting kits (see Recessed wall box mounting kit available to order.
Dimensions (H x W x D)	120 x 80 x 33 mm
Shipping Weight	0.25 kg
Serial Bus Communication	Proprietary protocol, 4 wire cable 7/0.16mm (26AWG), power and TTL signals. Maximum total bus cable length 12m. Requires RJ9 type connector (not included) : AMP ref. 0-737628-4 Molex ref. 90075-0027
Standards Compliance	CE Directive 89/336/EEC EN 50081-1/EN61000-6-3, EN 50082-2/EN61000-6-2

Specifications and Technical Data (continued)

AD-IRL/ILS/IRS Series Integrated Room Lighting and Sunblind Control Modules

Product Order Codes	AD-IRL1025-0 Module for 2 x Lighting Circuits with On/Off Control AD-IRL2025-0 Module for 2 x Lighting Circuits with On/Off and Dimming Control AD-ILS1035-0 Module for 2 x Lighting Circuits with On/Off Control and 1 x Sunblind Circuit with Up/Down Control AD-IRS1035-0 Module for 3 x Sunblind Circuits with Up/Down Control
Supply Voltage	230 VAC maximum 10A for all connected circuits to control module. Earth/ground connection required. Requires Wieland 3 Pin Connector type: WP (not included - see Tables 3 and 4)
External Fuse	External fuse or circuit breaker required (maximum 16A)
Ambient Operating Conditions	5° to 45°C 10 to 90% RH Noncondensing
Ambient Storage Conditions	-20° to 70°C 10 to 95% RH Noncondensing
Housing	Material: ABS + polycarbonate, UL94VO rated. Protection: IP30 (IEC529)
Mounting	Direct surface mount., plastic base for surface mount with wiring conduits, recessed wall box-, and panel mounting kits (see DIN Rail or 2 Screws (max. 3mm dia.) within ceiling area or in electrical panel.
Dimensions (H x W x D)	96 x 132 x 44 mm
Shipping Weight	0.4 kg maximum
Serial Bus Communication	Proprietary protocol, 4 wire cable 7/0.16mm (26AWG), power and TTL signals. Maximum total bus cable length 12m. Requires RJ11 type connector (not included) for serial bus from IRC or previous module: Molex ref. 90075-0035 Requires RJ9 type connector (not included) for serial bus to next module or IRM : Molex ref. 90075-0027
Physical Outputs	Lighting Circuit with On/Off Control: Relay contact powered by module at 230VAC, maximum 5A per circuit, (maximum 10A per control module). Requires Wieland 3 Pin Connector Type: WL (not included - see Tables 3 and 4) Lighting Circuit with On/Off and Dimming Control: Relay contact powered by module at 230VAC, maximum 5A per circuit, (maximum 10A per control module.) and Analog Output (1 – 10VDC) for dimming control. Requires Wieland 5 Pin Connector Type: WD (not included - see Tables 3 and 4) Sunblind Circuit with Up/Down Control: 2 relay contacts powered by controller at 230VAC, maximum 3A per circuit (maximum 10A per control module). Requires Wieland 4 Pin Connector Type: WS (not included - see Tables 3 and 4)
Standards Compliance	CE Directive 89/336/EEC EN61000-6-3, EN61000-6-2 CE Directive 73/23/EEC EN 60950 LVD

Specifications and Technical Data (continued)

AD-IRC Fan Coil Unit Controller

Product Order Codes	Fan Coil Unit Controller	Output Configuration
	AD-IRC4205-0	2 x 0 - 10 VDC for heating/cooling valve (Analog Output) 1 x Relay (voltage free) for electric heater (DAO) 3 x Relay (230VAC) for fan control (3 speed) <i>(See below for ratings)</i>
	AD-IRC4245-0	2 x Triac (230VAC) for heating/cooling valve (DAO) 1 x Relay (voltage free) for electric heater (DAO) 3 x Relay (230VAC) for fan control (3 speed) <i>(See below for ratings)</i>
Power Requirements	230 VAC, +10% -15%, at 50/60 Hz, 12 VA (not including external loads of valves and fan motor). Maximum current input 3A (690VA).	
External Fuse	External fuse or circuit breaker required (maximum 5A)	
Ambient Operating Conditions	5° to 45°C 5 to 95% RH Noncondensing	
Ambient Storage Conditions	-20° to 70°C 10 to 95% RH Noncondensing	
Housing	Material: Grey polycarbonate, UL94VO rated. Protection: IP20 (IEC529)	
Mounting	DIN Rail or 2 Screws (max. 3mm dia.) within FCU or other closed panel within 3m from valves and fan motor.	
Dimensions (H x W x D)	96 x 132 x 44 mm	
Shipping Weight	0.35 kg	
Terminations	Screw Terminals for max. 2 x 1.5mm ² wires.	
Physical Inputs	<p>Auxiliary Input: Volt-free contact 600 Ohm max. when closed or Discharge Air Sensor NTC 10k. 5 to 45°C. Accuracy +/- 0.2°C at 20°C (sensor tolerance and wire resistance not included).</p> <p>Window Input: Volt-free contact 600 Ohm max. when closed.</p> <p>Space Sensor (option - when sensor in IRM is not used): NTC 10k. 5 to 45°C. Accuracy +/- 0.2°C at 20°C (sensor tolerance and wire resistance not included)</p> <p>Command Module Inputs: L1: (option) Presence Detector Input – Volt-free contact 600 Ohm max. when closed.</p>	
Physical Outputs	<p>Fan Control: 3 relay contacts powered by controller at 230VAC, maximum 3A.</p> <p>Heating/Cooling Valve Control: AD-IRC4205-0: 0 – 10 VDC maximum 10mA AD-IRC4245-0: 2 triac outputs powered by controller at 230VAC, maximum 300mA for thermal actuators with pulse width modulated [PWM] / duration adjust output [DAO] control. <i>(Outputs configured for incremental actuators [PAO] available on request.)</i></p> <p>Electric Heater Control: Relay contact (volt-free) rated for 230VAC 2kW maximum with pulse width modulated [PWM] / duration adjust output [DAO] control.</p>	
LONWORKS Communication	Neuron 3150 and Free Topology Transceiver FTT10a, 78 kbps twisted pair network. <i>(For network cables and layout refer to LonMark Specifications at www.lonmark.org.)</i> Service Pin provided.	
Serial Bus Communication	Proprietary protocol, 4 wire cable 7/0.16mm (26AWG), power and TTL signals. Maximum total cable length 12m. Maximum 3 serial bus modules can be connected. Only one of each type may be used. (AD-ILS, AD-IRL, AD-IRS, AD-IRM.) Requires RJ9 type connector (not included) - AMP ref. 0-737628-4 Molex ref. 90075-0027	
Standards Compliance	CE Directive 89/336/EEC EN 50081-1/EN61000-6-3, EN 50082-2/EN61000-6-2, CE Directive 73/23/EEC EN 60950 LVD LonMark Certification (Pending)	
External Interface File	JCSCCIRC1.XIF – IRC Model 1 Firmware SPID: 80:00:11:55:01:04:04:11	

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products, and reserves the right to change or supplement the contents of this publication.

Metasys® is a registered trademark of Johnson Controls. LONWORKS® and LONMARK® are registered trademarks of the Echelon Corp.



Johnson Controls International, Inc.

Headquarters:

European Distribution Centre:

European Factories:

Branch Offices

Milwaukee, Wisconsin, USA

Westendhof 3, D-45143 Essen, Germany

Essen (Germany) and Lomagna (Italy)

Principal European Cities.