[redacted]

**PROJECT DESCRIPTION |** [redacted]

National Army Museum|

| Part Description | Part Number | Manufacturer | Total Quantity | Average Delivery Time | [redacted] |
|---|---|---|---|---|---|
| Outside Air Temperature Sensor | TT-331-A | Sontay | 1 | | |
| Immersion Temperature Sensor | TT-341-A | Sontay | 18 | | |
| Immersion Temperature Sensor Stainless Steel Pocket | TT-PO521 | Sontay | 18 | | |
| Wall Mounted Room Air Temperature Sensor | TT-1000-A | Sontay | 5 | | |
| 2-Port Isolation Valve | D665N / SR24A- S1A | Belimo | 2 | | |
| Butterfly Valve c/w Aux Switch | D6100N / GR24A-5/S1A | Belimo | 2 | | |
| Differential Pressure Sensor | PL-692-4-V | Sontay | 1 | | |
| MCC-01 | | Panel Shop | 1 | | |
| MCC-02 | | Panel Shop | 1 | | |
| Differential Pressure Switch | PL-FD113 | Sontay | 4 | | |
| Immersion Thermostat | ST-I-01A | Sontay | 3 | | |
| Water Tank Level Switch | 1CLRLG01//3PVC | IBC | 4 | | |
| | TT-555-A-R | Sontay | 4 | | |
| Duct Mounted High Limit Humidistat | RH-SH-1D | Sontay | 3 | | |
| Differential Pressure Switch | PA-DPS-88 | Sontay | 2 | | |
| Overide Button With LED | | Fortune | 1 | | |
| | TT-555-A | Sontay | 41 | | |
| Temperature & CO2 Sensor | GS-CO2-622 | Sontay | 11 | | |
| | SM24A-S | Belimo | 9 | | |
| | VS-VMR-12 | Sontay | 1 | | |
| | VS-VMR-08 | Sontay | 1 | | |
| Cylon Controller | UC.32.netK/WEB/MOD | Cylon | 2 | | |
| Cylon Controller | UC.32.24 | Cylon | 7 | | |
| Cylon Controller | UC.32.16 | Cylon | 1 | | |
| Cylon Controller | UC.32.16DI | Cylon | 1 | | |
| Cylon Controller | UC.32.8 | Cylon | 0 | | |
| OSS Meter Interface Controller | | IBC | 2 | | |
| UCU10-FCK | | Cylon | 56 | | |
| Unitron Single User Licence | | Cylon | 1 | | |
| Intel Pentium 4, 256Mb RAM, 40Gb HDD, 1.44Mb FDD, 32Mb Graphics Card | | Microaid | 1 | | |
| Space Temperature & CO2 Sensor | GS-CO2-1001 | Sontay | 8 | | |
| Differential Pressure Sensor | PL-692-6-V | Sontay | 7 | | |
| Ethernet Switch | EIBA5-T/R100 | Cylon | 1 | | |
| Potentiometer | | Fortune | 41 | | |
| Air Humidity Sensor | RH622 | Sontay | 6 | | |

# GS-CO2-1001

# Space Mounted $C0_2$, Temperature & RH Sensors


## Features:

- $C0_2$ Self-calibration algorithm
- Selectable 0-10Vdc, 0-5Vdc or 4-20mA output
- Direct thermistor options available
- LCD display, fan speed, set point & momentary switch options
- "Traffic Light" LED $CO_2$ indication option

## Benefits:

- Aesthetically pleasing housing
- Long sensor life
- Energy saving by ventilating at the optimum $C0_2$ levels

## Technical Overview

The GS-CO2-1001 range combines $CO_2$ and Temperature or C02, temperature & RH sensing in one housing.

Using a non-dispersive infrared sensor for measuring $CO_2$ concentrations and utilizing microprocessor based electronics, the unique self-calibration algorithm offers long-term stability and accuracy. They are also fitted with a temperature output or RH & temperature output. A directly connected passive resistive temperature output is also available, as an alternative to the standard active temperature output.

The sensor can be used to ensure adequate ventilation while maximizing energy savings by ventilating at the optimum level, making these ideal for all types of ventilation in commercial buildings, industrial plants, laboratories and public spaces, such as schools.

Tel: +44 (0)1732 861200. - E-mail: sales@sontay.com. - Web: www.sontay.com.

## Specification:

| | |
|---|---|
| Outputs | 0-10Vdc, 0-5Vdc or 4-20mA |
| Power supply | 24Vac/dc |
| Supply current | 140mA max. |
| Output ranges: | |
| $CO_2$ | 0 to 2000ppm |
| Temperature | 0 to 40°C |
| Optional | |
| -HR | 0 to 5000ppm |
| -RHT | 0 to 100% |
| -T | PTC/NTC Element Any Sontay resistive type |
| Accuracy: | |
| $CO_2$ | ±30ppm +5% of reading |
| Temperature | ±0.5°C |
| RH | ±3%RH (20 to 80%) |
| Stability: | |
| $CO_2$ | <2% of FS over sensor life |
| Temperature | ±0.1°C |
| RH | ±1%RH per year |
| Ambient: | |
| Temperature | 0°C to 50°C |
| RH | 0 to 95% RH, non-condensing |
| Housing: | |
| Material | ABS (flame retardant) |
| Colour | polished white finish |
| Dimensions | 115 x 85 x 28mm |
| Protection | IP30 |
| Country of origin | UK |

CE

The products referred to in this data sheet meet the requirements of EU Directive 2004/108/EC

## Part Codes:

**GS-CO2-1001**
Space $CO_2$ & T transmitter 0-2000ppm

**GS-CO2-RHT-1001**
Space $CO_2$, RH & T transmitter 0-2000ppm

*Suffixes (add to part code)*

**-T** Direct resistive temperature output*
Thermistor types:

| | | |
|---|---|---|
| **A** (10K3A1) | **B** (10K4A1) | **C** (20K6A1) |
| **H** (SAT1) | **K** (STA1) | **L** (TAC1) |
| **M** (2.2K3A1) | **N** (3K3A1) | **P** (30K6A1) |
| **Q** (50K6A1) | **S** (SAT2) | **T** (SAT3) |
| **W** (SIE1) | **Y** (STA2) | **Z**(10K NTC) |

Platinum types:
**D** (PT100a) **E** (PT1000a)
Nickel types:
**F** (NI1000a) **G** (NI1000a/TCR (LAN1))

**-HR**
0-5000ppm $CO_2$ range

**-SP**
2-Wire resistive set point 0-10KΩ or 11-1KΩ

**-MS**
Momentary switch

**-FS3**
Resistive 3-speed fan switch

**-FS4**
Resistive 4-speed fan switch

**-FS5**
Resistive 5-speed fan switch

**-LCD**
Integral LCD

**-TR**
Custom temperature output range scaling

**-LED**
3-colour LED indication for $CO_2$

**Note*:**
When using the **-T** option, they are not compensated for internal heating.

Current versions are NOT loop powered and will require a common 0V connection.

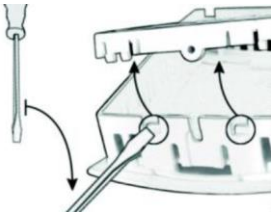
# Installation:


Antistatic precautions must be observed when handling these sensors. The PCB contains circuitry that can be damaged by static discharge.

1. Select a location on a wall of the controlled space which will give a representative sample of the prevailing room condition. Avoid sitting the sensor in direct sunlight, on an outside wall or near heat sources. An idea mounting height is 1.5m from the floor.

2. Undo the tamperproof screw at the bottom of the housing.

3. To remove the front panel from the base, twist a screwdriver as below and pull gently the front panel from the base.



4. Using the base as a template mark the hole centres and fix to the wall with suitable screws. Alternatively the base plate can be mounted on to a conduit box or standard recessed back box. The base plate is suitable for EU & North America fixings.

5. Feed cable through the hole in the base plate of the housing and terminate the cores at the terminal block as required. Leaving some slack inside the unit.

6. Set yellow dip-switches according to output type required (see page 5 for dip-switch details).

7. Replace the housing to the base plate and fit the tamperproof screw (if required) through the lug at the bottom of the base plate.

8. Before powering the sensor, ensure that the supply voltage is within the specified tolerances.
**Note:** When using the sensor with a 4-20mA output, it is important to make all electrical connections before applying the supply voltage. If the sensor is not connected sequence, then you may see a higher reading than expected (can be as much as 55mA).

9. Allow 10 minutes before carrying out pre-commissioning checks. This will allow the electronics time to stabilise and full commissioning should not be carried out for at least 48 hours. This will enable the ABC Logic self-calibration procedure to complete.

# ABC Logic Self-Calibration:

When first powering the transmitter, it needs to be powered continuously for at least 2 days. This will allow the $C0_2$ sensors ABC Logic self-calibration system to operate correctly.

# Connections:

Left Hand terminal Block:

| | |
|---|---|
| **24V** | Supply + 24Vac or Vdc (see note below) |
| **GND** | Supply 0V |
| **OP1** | Temperature output (see J11 settings) |
| **OP2** | Optional RH output |
| **GND** | Common 0V |
| **OP3** | $CO_2$ Output |
| **GND** | Common 0V |
| **OVRD** | 0-10Vdc input to indicate occupancy or override. Note that this can only be used if voltage output is used, as it needs a common 0V, and if the LCD option is fitted. |

Right Hand Terminal Block (if option's are selected);

| | |
|---|---|
| **T2** | Direct thermistor output only (other half of OP1 if J11 is set to T) |
| **MS1** | Momentary switch VFC output |
| **MS2** | Momentary switch output |
| **P5*** | Set point |
| **P6*** | Set point wiper |
| **P7*** | Set point |
| **FS2** | Fan speed switch output, resistive |
| **FS1** | Fan speed switch output, resistive |

**Notes:**

| | |
|---|---|
| Voltage output | Nominal voltage 24Vac/dc. |
| Current output | Nominal voltage 24Vac/dc 3-wire |
| Set point* | 2-wire 11-1kΩ output is required use terminals P6 and P7<br>2-wire 0-10kΩ output is required, use terminals P5 and P6 |

Direct thermistor output (if fitted) is between terminals OP1 and T2, polarity is independent. When using the **-T** option, they are not compensated for internal heating.

# Options:

**Set point**, this is available in two standard values;

| - | + | (legend markings on housing fascia) |
|---|---|---|
| 0kΩ | 10kΩ | |
| 11kΩ | 1kΩ | |

Using an external 1kΩ resistor (not supplied) on the 0-10k terminals 1-11kΩ can be achieved if required.
Potentiometer tolerances are ±30%

**Fan speed**, the position of the selector switch will cause the resistance between the terminals to alter as shown below.

| Switch position | Output |
|---|---|
| 0 | Open circuit |
| 1 | 22.7kΩ |
| 2 | 26kΩ |
| 3 | 29.3kΩ |
| Auto | 32.6kΩ |

**Momentary switch**, rated at 24Vac/dc @ 500mA max.

# Dipswitch/Jumper Settings & PCB Layout:

**Main board**

**J10**

If the outputs are set to voltage (by putting jumpers J1, J2 and J3 in the "V" position), the output can be set to either 0-10Vdc or 0-5Vdc;

**J1, J2, J3**

These set the output to either voltage of current:
V for voltage, I for current

**J11**

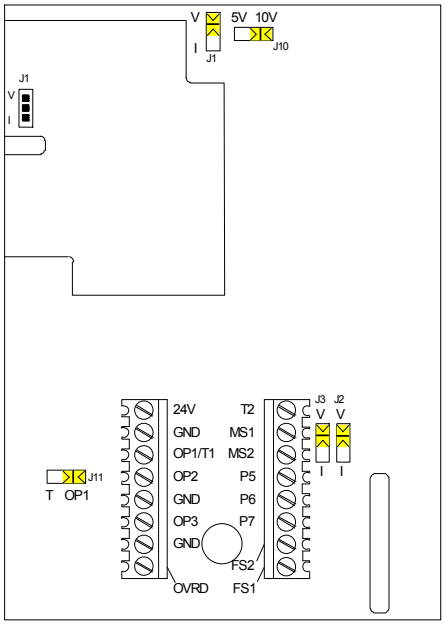
Selects either active temperature output (current or voltage) or direct thermistor.

OP1 = Active temperature output
T = Direct thermistor

**$CO_2$ board**

**J1**

This sets the output to either voltage of current:
V for voltage, I for current




**Note:** When using current output mode the **GS-CO2-1001** is NOT loop powered and will require a common 0V connection.

# LED $CO_2$ Level Indication:

The LED is configured to turn from green to amber when the $CO_2$ level rises above 1000ppm. The colour changes to red when the $CO_2$ level exceeds 1500ppm. These levels are customizable, but alternative values MUST be stated when ordering, as they cannot be changed on site.



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## EC DECLARATION OF CONFORMITY

As detailed under the following:

1. The Low Voltage Directive (LVD) 2014/35/EU and U.K. legislation The Electrical Equipment (Safety) regulations 1994 (SI 1994/3260)

The Declaration of Conformity is provided for the following equipment:

**Equipment:**

PL-FD113 Liquid DP switch 0.3-4.5 bar setting dial

**Manufacturer:**

Sontay Ltd.,
Four Elms Road,
Edenbridge,
Kent. TN8 6AB

**Declaration**

Sontay Ltd. declare that the products listed above conform, when installed and operated in accordance with current relevant installation and operational standards and practices together with any additional information contained in the data sheet and/or manual, to the above standards.

Signed: 

(Authorised signatory)

Stacey Lucas
Operations Manager

15/11/2016

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1. The Low Voltage Directive (LVD) 2014/35/EU and U.K. legislation The Electrical Equipment (Safety) regulations 1994 (SI 1994/3260)

The Declaration of Conformity is provided for the following equipment:

**Equipment:**

ST-I-01A Immersion Thermostat 0 to 120C Auto Reset

**Manufacturer:**

Sontay Ltd.,
Four Elms Road,
Edenbridge,
Kent. TN8 6AB

**Declaration**

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Sontay ... experts in Field Controls

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2. The Low Voltage Directive (LVD) 2014/35/EU and U.K. legislation The Electrical Equipment (Safety) regulations 1994 (SI 1994/3260)

The Declaration of Conformity is provided for the following equipment:

**Equipment:**

TT-341-A Immersion Temp Sensor 10K3A1 L=150mm

**Manufacturer:**

Sontay Ltd.,
Four Elms Road,
Edenbridge,
Kent. TN8 6AB

**Declaration**

Sontay Ltd. declare that the products listed above are deemed to fall outside the scope of both Council Directive 2004/108/EC relating to electromagnetic compatibility, and Council Directive 2006/95/EC, the Low Voltage Directive.

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2. The Low Voltage Directive (LVD) 2014/35/EU and U.K. legislation The Electrical Equipment (Safety) regulations 1994 (SI 1994/3260)

The Declaration of Conformity is provided for the following equipment:

**Equipment:**

TT-PO-521 ** STAINLESS STEEL ** Immersion Pocket

**Manufacturer:**

Sontay Ltd.,
Four Elms Road,
Edenbridge,
Kent. TN8 6AB

**Declaration**

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Stacey Lucas
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2. The Low Voltage Directive (LVD) 2014/35/EU and U.K. legislation The Electrical Equipment (Safety) regulations 1994 (SI 1994/3260)

The Declaration of Conformity is provided for the following equipment:

**Equipment:**

TT-341-A Immersion Temp Sensor 10K3A1 L=150mm

**Manufacturer:**

Sontay Ltd.,
Four Elms Road,
Edenbridge,
Kent. TN8 6AB

**Declaration**

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2. The Low Voltage Directive (LVD) 2014/35/EU and U.K. legislation The Electrical Equipment (Safety) regulations 1994 (SI 1994/3260)

The Declaration of Conformity is provided for the following equipment:

**Equipment:**

TT-1000-A Space Air Temperature Sensor 10K3A1

**Manufacturer:**

Sontay Ltd.,
Four Elms Road,
Edenbridge,
Kent. TN8 6AB

**Declaration**

Sontay Ltd. declare that the products listed above are deemed to fall outside the scope of both Council Directive 2004/108/EC relating to electromagnetic compatibility, and Council Directive 2006/95/EC, the Low Voltage Directive.

Signed:  (Authorised signatory)

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2. The Low Voltage Directive (LVD) 2014/35/EU and U.K. legislation The Electrical Equipment (Safety) regulations 1994 (SI 1994/3260)

The Declaration of Conformity is provided for the following equipment:

**Equipment:**

TT-331-A Outside Air Temp Sensor 10K3A1

**Manufacturer:**

Sontay Ltd.,
Four Elms Road,
Edenbridge,
Kent. TN8 6AB

**Declaration**

Sontay Ltd. declare that the products listed above are deemed to fall outside the scope of both Council Directive 2004/108/EC relating to electromagnetic compatibility, and Council Directive 2006/95/EC, the Low Voltage Directive.

Signed:  (Authorised signatory)

Stacey Lucas
Operations Manager 15/11/2016

# TT-555
# Flying Lead Temperature Sensors

## Features:

- Wide range of sensing element types
- Stainless steel end cap
- Waterproof potting option

## Benefits:

- Longer cable options reducing the need for additional junction boxes
- Low cost for applications such as fail coil, VAV or other restricted spaces

## Technical Overview

The flying lead range of temperature sensors are designed to measure air temperature in small duct spaces such as VAV boxes, fan coil units or other restricted spaces. The sensing element is housed in a stainless steel probe with 2 meters (6.56ft) of screened cable as standard. Units contain either a high quality thermistor, Nickel or Platinum sensing element.

Longer cable lengths are available to order (at extra cost) along with a potted variant for low temperature applications or water submersion.

The -CVO active output option combines 4 pre-set ranges and selectable output mode, customised output range scaling enabling a choice of outputs and ranges on one unit.

Tel: +44 (0)1732 861200. - E-mail: sales@sontay.com. - Web: www.sontay.com.

## Specification:

Output types:

| | | |
|---|---|---|
| | Passive | Resistive |
| | Active (selectable) | Current 4-20mA *or* |
| | | Voltage 0-10Vdc |

Accuracy:

| | |
|---|---|
| Thermistor | ±0.2°C 0 to 70°C (32 to 158°F) |
| PT100a | ±0.2°C @ 25°C (77°F) |
| PT1000a | ±0.2°C @ 25°C (77°F) |
| NI1000 | ±0.4°C @ 0°C (32°F) |
| -CVO | ±0.4°C @ 25°C (77°F) |

Probe:

| | |
|---|---|
| Material | Stainless steel |
| Dimensions | 30 x 6mm dia. (1.18 x 0.25") |
| | (Not including outer heatshrink) |

| | |
|---|---|
| Cable length | 2 meters (6.56ft) as standard |

Protection:

| | |
|---|---|
| Standard | IP40 |
| With -R option | IP67 |

| | |
|---|---|
| Ambient range | -10 to +60°C (14 to 140°F) |
| Weight | 80g (0.18lb) |

Country of origin:

| | |
|---|---|
| Types A, B & C | China |
| Others | UK |

CE

The TT-xxx-CVO products referred to in this data sheet meet the requirements of EU Directive 2004/108/E

## Part Codes:

**TT-555** Flying Lead Sensor

*Sensing Element (add type to above code)*

Passive output:

| | |
|---|---|
| **-A** | (10K3A1) Trend, Cylon, Distech |
| **-B** | (10K4A1) Andover, Delta Controls |
| **-C** | (20K6A1) Honeywell |
| **-D** | (PT100a) Serck |
| **-E** | (PT1000a) Cylon |
| **-F** | (NI1000a) Sauter |
| **-G** | (Ni1000a/TCR(LAN1)) Siemens |
| **-H** | (SAT1) Satchwell |
| **-K** | (STA1) Landis & Staefa |
| **-L** | (TAC1) TAC |
| **-M** | (2.2K3A1) Johnson Controls |
| **-N** | (3K3A1) Alerton |
| **-P** | (30K6A1) Drayton |
| **-Q** | (50K6A1) Ambiflex |
| **-R** | (100K6A1) York >40°C |
| **-S** | (SAT2) Satchwell |
| **-T** | (SAT3) Satchwell |
| **-W** | (SIE1) Siebe |
| **-Y** | (STA2) Landis & Staefa |
| **-Z** | (10K NTC) Carel |

Active output:

| | |
|---|---|
| **-CVO** | 4-20mA/0-10Vdc selectable output |
| **-CVO-C** | 4-20mA/0-10Vdc selectable output with custom temp. scaling |

Suffix (at extra cost):

| | |
|---|---|
| **-5M** | 5m (16.40ft) cable |
| **-R** | Cap potted (waterproof) |

**Note.** The -CVO transmitter is fitted into a double entry housing.

# Connections:

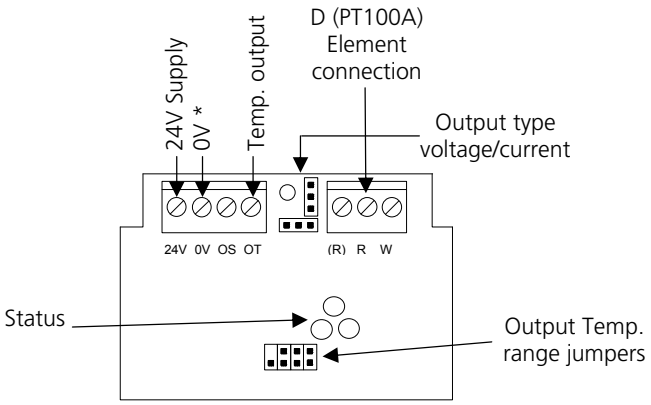
All connections to BEMS controllers, data recorders etc. should be made using screened cable. Normally, the screen should be earthed at one end only (usually the controller end) to avoid earth hum loops which can create noise. Low voltage signal and supply cables should be routed separately from high voltage or mains cabling. Separate conduit or cable trays should be used. Where possible, the controller's earth should be connected to a FUNCTIONAL EARTH, rather than the mains safety earth. This will provide better immunity to high frequency noise. Most modern buildings have a separate earth for this purpose.

Passive output:

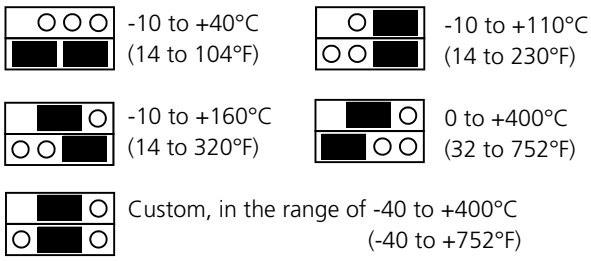
Thermistor:
The pre-striped 2-wair connections are polarity independent and should be terminated as required. No terminal block is provided.

Platinum and nickel types:
The pre-striped 2, 3 or 4-wire connections are polarity independent and should be terminated as required. No terminal block is provided.

Active output:




***** Not required with 4-20mA output





**Notes:**

Voltage output — Nominal voltage 24Vac/dc.

Current output — If using in current output mode, the sensor must only be used with a 24Vdc supply. The sensor may be damaged if supplied with AC.

The selectable output temperature ranges are dependent on sensor type, ambient and application.

For full connection and specification please refer to the TT-CVO data sheet.

# Element Type Colour Coding:

| Element code | Element type | Flying lead band colours |
|---|---|---|
| **A** | 10K3A1 | White/White |
| **B** | 10K4A1 | Green/Green |
| **C** | 20K6A1 | Red/Blue |
| **D** | PT100A | Red/White |
| **E** | PT1000A | Black/Blue |
| **F** | NI1000A | Yellow/Black |
| **G** | NI1000A TCR (LAN1) | Yellow/Yellow |
| **H** | SAT1 | White/Yellow |
| **K** | STA1 | Green/Black |
| **L** | TAC1 | Blue/Yellow |
| **M** | 2.2K3A1 | Green/Blue |
| **N** | 3K3A1 | Red/Yellow |
| **P** | 30K6A1 | Black/Black |
| **Q** | 50K6A1 | Red/Green |
| **R** | 100K6A1 | Blue/Blue |
| **S** | SAT2 | Red/Black |
| **T** | SAT3 | White/Blue |
| **W** | SIE1 | Green/White |
| **Y** | STA2 | Red/Red |
| **Z** | NTC 10 | White/Black |
| **CVO** | 4-20mA/0-10Vdc | Red/White |



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# RH-SH

# Room & Duct Hummidistat's


## Features:

Space
- Single or 2-stage version available

Duct
- Suitable for swimming pool applications

## Technical Overview

The RH-SH range of humidistat's are designed for wall or duct mounting for the ON/OFF control of humidification and dehumidification equipment, or the initiation of alarms or override controls.

High quality sensing elements ensure accurate measurement and switching differential.

## Specification:

| | |
|---|---|
| Switch rating | |
| Space (resistive): | |
| Humidify | 2A @ 250Vac |
| Dehumidify | 5A @ 230Vac |
| Duct | 15(2)A @ 24-250Vac |
| Stage differential | 2-15%RH |
| Differential | 4%RH |
| Accuracy | Approx. 3%RH |
| Operating range | 35-100%RH |
| Permissible air speed | 8 m/s (duct only) |
| Housing material | ABS |
| Sensing element | Synthetic fabric bands |
| Dimensions | See page 4 |
| Ambient range | -10 to +65°C (14 to 149°F) |
| Protection: | |
| Space | IP20 |
| Duct | IP65 (conceled adjust) |
| | IP20 (exposed adjust) |
| Country of origin | Italy |

CE

The products referred to in this data sheet meet the requirements of EU 2004/108/EC and 2006/95/EC

## Part Codes:

### Space

**RH-SH-1R**
Single stage humidistat with concealed adjustment

**RH-SH-1RE**
Single stage humidistat with exposed adjustment

**RH-SH-2R**
2-stage humidistat with concealed adjustment

### Duct

**RH-SH-1D**
Single stage humidistat with concealed adjustment

**RH-SH-1DE**
Single stage humidistat with exposed adjustment

# Installation & Connections:

**Common Spec**

1. The RH-SH range should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)

2. Ensure that all power is disconnected before carrying out any work on the RH-SH.

3. Select a location where contaminants are at a minimum, and which will give a representative sample of the prevailing condition.

**Space**

4. Undo the tamperproof screw at the bottom of the housing and gently pull the front panel from the base.

5. Using the base as a template mark the hole centres and fix to the wall with suitable screws.

**Duct**

4. If the sensor is to be mounted outside, it is recommended that the unit be mounted with the cable entry at the bottom. If the cable is fed from above then into the cable gland at the bottom, it is recommended that a rain loop be placed in the cable before entry into the sensor.

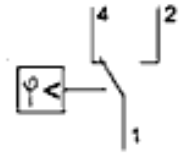
5. Remove the front cover, and separate from the main body.

**Common Spec**

6. Feed cable in the housing and terminate the cores at the terminal block, leaving some slack inside the unit.

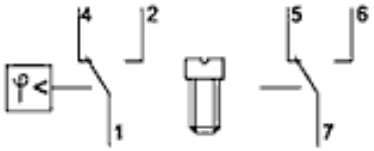
7. Replace the front cover to the base plate/main body, and tighten screws.

**Single stage versions:**




| | |
|---|---|
| 1 | Common |
| 2 | N/O |
| 4 | N/C |

**Dual stage versions:**




| | |
|---|---|
| 1 | Common |
| 2 & 6 | N/O |
| 4 & 5 | N/C |

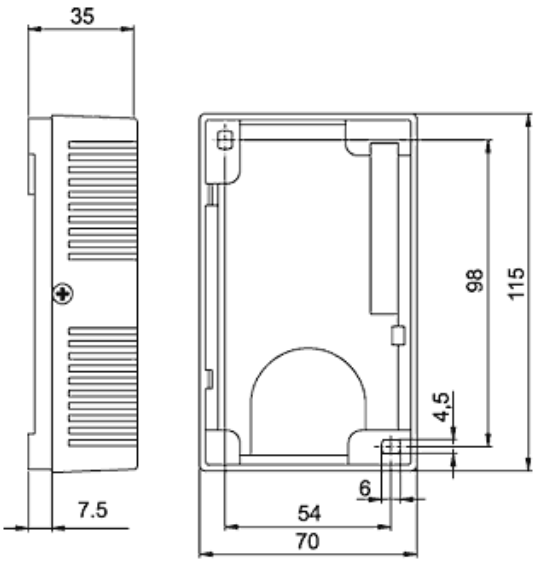
The contact 1-2 (7-6) closes and 1-4 (7-5) opens when the relative air humidity drops below the setpoint.

# Warning:

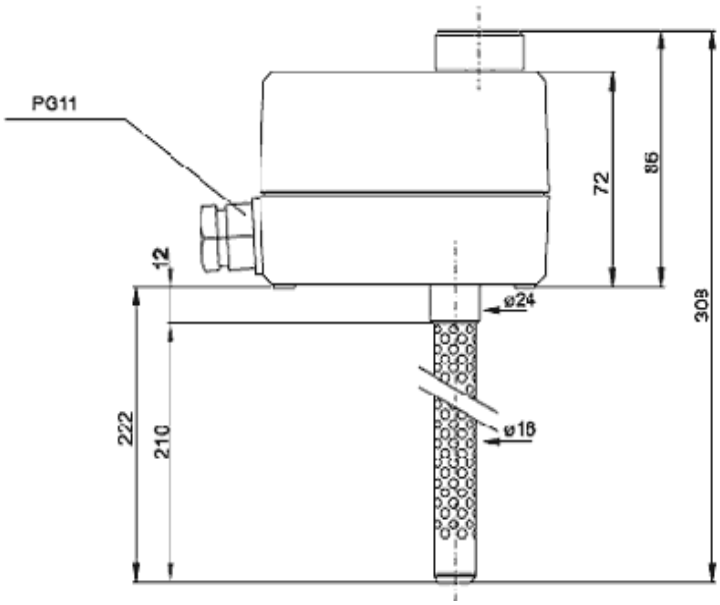
The measurement location of the humidity controller should be selected so that no water can condense on or in the device. This applies particularly for operation with voltage higher than 48V. Failure to comply with this can result in damage to the controller.

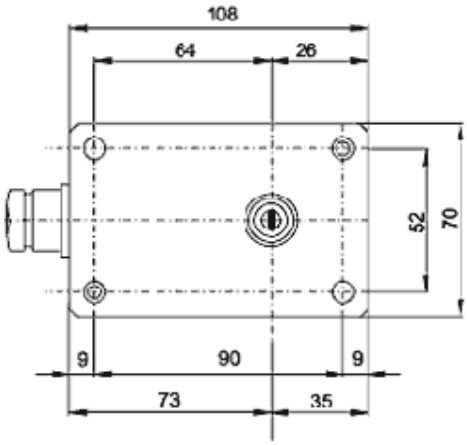
# Dimensions:

Space:




Duct:



# PA-DPS-8x

# Air Differentail Pressure Switch

## Features:

- Close switching differential
- Duct fixing kit included

## Benefits:

- Switching point easily adjusted with scale in Pascals
- Conduit entry can be rotated in steps of 120°
- One screw needed for housing cover

## Technical Overview

The PA-DPS-8x range of air differential pressure switches are suitable for low differential pressure switching applications, and are ideal for providing indication of fan status or 'filter dirty' conditions in air, non-combustible, non-aggressive gases in air conditioning and ventilating installations.

The switching knob is mounted under the cover to avoid tampering.

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## Specification:

| | |
|---|---|
| Measurement ranges: | |
| PA-DPS-88 | 20 to 300Pa (0.08 to 1.2"w/c) |
| PA-DPS-83 | 50 to 500Pa (0.20 to 2"w/c) |
| PA-DPS-85 | 200 to 1000Pa (0.8 to 4"w/c) |
| Differential: | |
| PA-DPS-88 | 10Pa (0.04"w/c) |
| PA-DPS-83 | 20Pa (0.08"w/c) |
| PA-DPS-85 | 100Pa (0.4"w/c) |
| Maximum pressure | 5000Pa (20" w/c) |
| Pressure connections | 6mm ID push-on tubing |
| Electrical rating | 1.5A (0.4) @ 250Vac |
| Approvals | Switch according to VDE0630 UG1652 |
| Connections | Via 6.3mm crimp-type sockets |
| Cable entry | PG11 |
| Material | Plastic moulding |
| Dimension | 130 x 130 x 99mm (5.12 x5.12 x 3.90") |
| Ambient: | |
| Temp | -20 to +85°C°C (-4 to +185°F) |
| RH | 0 to 95% non-condensing |
| Protection | IP54 |
| Country of origin | Germany |

CE

The products referred to in this data sheet meet the requirements of 2006/95/EC

## Part Codes:

PA-DPS-88
20 to 300Pa (0.08 to 1.2"w/c) Air DP switch

PA-DPS-83
50 to 500Pa (0.20 to 2"w/c) Air DP switch

PA-DPS-85
200 to 1000Pa (0.8 to 4"w/c) Air DP switch

Accessories

PA-DPS-B
Right Angle Mounting Bracket

DFK
Duct Fixing Kit

TEE
Tee-Piece (pack of 10)

PA-TUBE-8MM
PVC Tube 8mm o/d x 1.5mm Wall, 30m Reel

A 'duct fixing kit' is supplied with the PA-DPS, consisting of 2m (6.56ft) of 6mm i/d plastic tubing, 2 x pitot tubes and 4 x fixing screws (see page 4).

# Installation:

1. The PA-DPS should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)

2. Ensure that all power is disconnected before carrying out any work on the PA-DPS.

3. Fix the switch to a suitable flat surface, maximum diameter of the screws must not be bigger than 8mm. Do not over tighten the screws, in order to avoid deformation of the devices base.
   Mount the pressure switch with the pressure connections pointing downwards, to drain condensation moisture which might occur.
   Mount the pressure switch horizontally (electrical connectors pointing upwards) only, if no condensate can form. In this position, the switching values are approximately 20Pa higher as indicated on the scale.

4. Remove the cover by unscrewing the single screw.

5. Terminate at the crimp-type sockets as required and set the desired switching pressure on the setting knob using a screwdriver.

6. Replace the cover and tighten the single screw, it is possible to move the cable entry in steps of 120°.

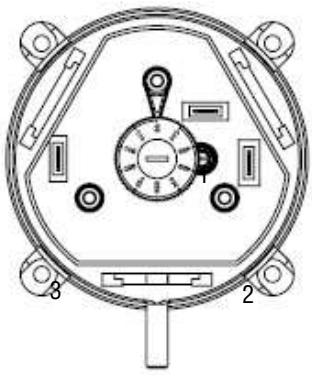
7. Push the pressure tubing onto the pressure ports on the unit. Ensure that the Hi and Lo ports have been correctly identified.

   - P1 (+) Over pressure measurement
   - P2 (-) Vacuum Measurement
   - P1 & P2 Differential pressure measurement

**CAUTION**

The PA-DPS will be damaged if subjected to excessive pressure. Do NOT test the unit by blowing into the inlet ports.

# Connections:




| | |
|---|---|
| 1 | N/C Contact |
| 2 | N/O Contact |
| 3 | Common |

# Applications:

If the switch is to be used for filter status monitoring, the pitot tube ends should be cut square. If the switch is to be used for fan status monitoring, the ends of the pitot tube should be cut at an angle of 45°

Fan status monitoring:
The switch can be used across a fan to provide proof of air flow and hence fan status. Fig. 1 shows how to connect the High and Low pressure ports:

Filter status monitoring:
The switch can be used across a filter to provide dirty filter status. Fig. 2 shows the connections for this application.

Fig. 1

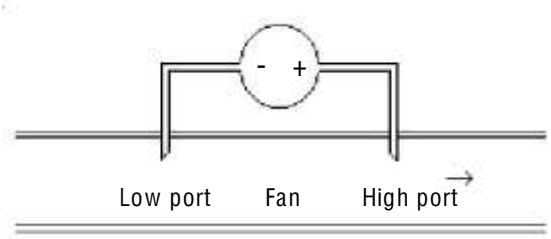
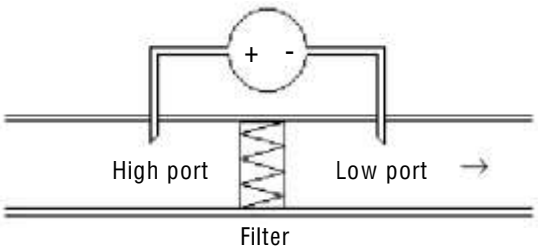


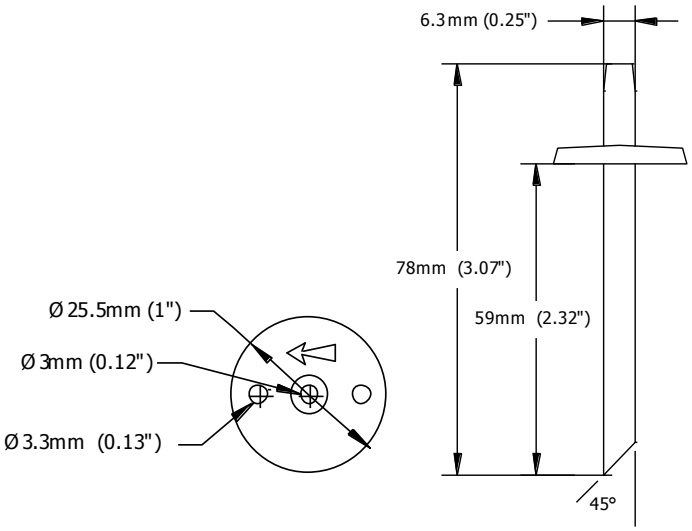

Fig. 2



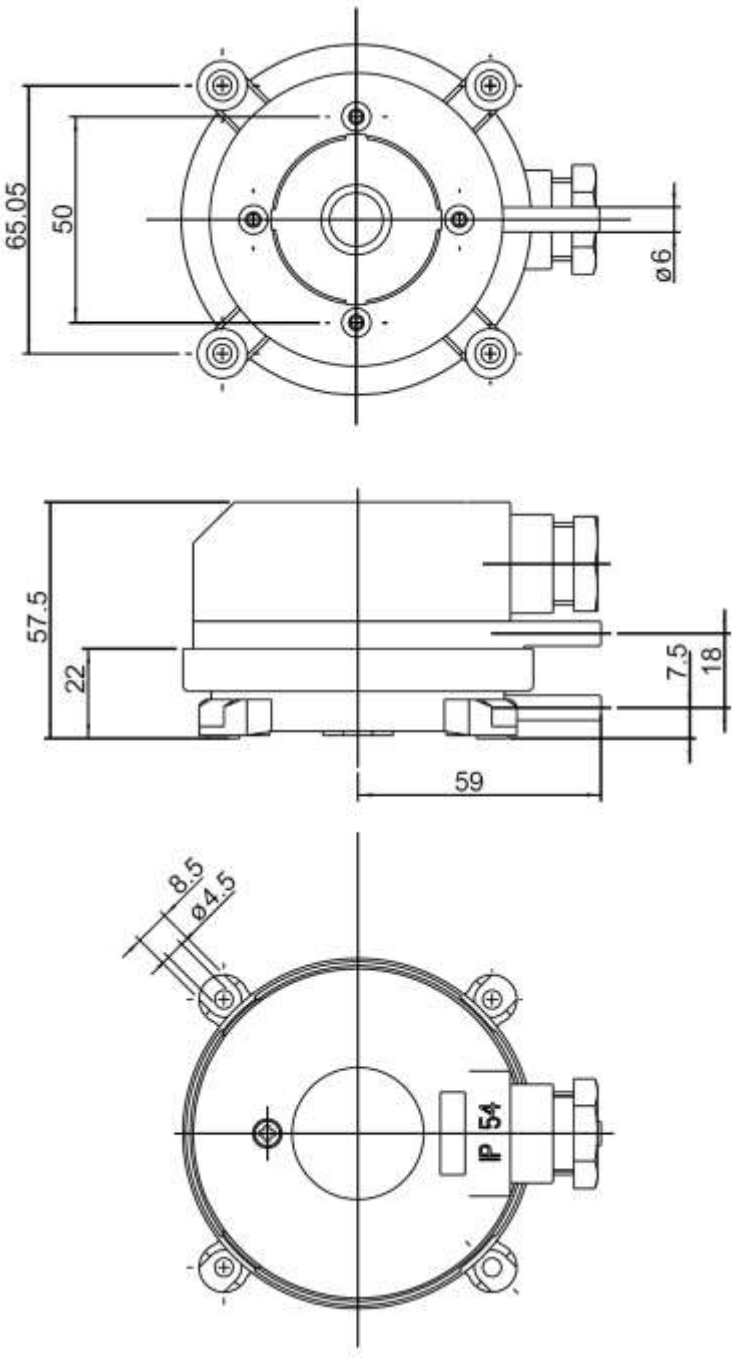

# Duct Fixing Kit:

A 'duct fixing kit' is supplied with the PA-DPS, consisting of 2m (6.56ft) of 5mm i/d plastic tubing, 2 x pitot tubes and 4 x fixing screws.

Pitot tube dimensions;



# Dimensions:



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# VS-VMR

# Automatic Reset Normally Closed Gas Valves

## Features:

- EN 161 Class A (sealing), Group 2 (connections)
- Suitable for air & non-aggressive gases included in the 1, 2 & 3 families
- Fine mesh filer to protect valve seat and disc
- 230Vac or 24Vac solenoid coil options
- Optional Closed Position Indicator switch

## Technical Overview

The VS-VMR type valve is a fast opening single-stage solenoid valve, normally closed (open when energized). This type of device is suitable for air or gas blocking and releasing controls, required in gas power burners, atmospheric gas boilers, industrial kilns and others gas consuming appliances.

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## Specification:

| | |
|---|---|
| Power supply | 230Vac / 24Vac options |
| Voltage tolerance | -15% to +10 % |
| Consumption | See table on page 5 |
| Cable entry | M20 x 1.5 for terminal box, PG8 for standard plug |
| Connections: | |
| 15 to 50mm | Screwed F/F ISO 7-1 |
| 65 to 150mm | Flanged PN16 to ISO 7005 |
| Closure/Opening time | ≤1 s |
| Max. closing pressure | 200mbar |
| Filter | 600µm |
| Ambient temp. | -18 to +60 °C |
| Valve body material | Aluminium alloy |
| Protection | IP54 |
| Country of origin | Italy |

CE

*24Vac versions*
The products referred to in this data sheet meet the requirements of EU Directive 2004/108/EC

*230Vac versions*
The products referred to in this data sheet meet the requirements of 2006/95/EC

## Part Codes:

Screwed valves:

| | |
|---|---|
| **VS-VMR-01-LV** | ½" BSP, 24Vac coil |
| **VS-VMR-02-LV** | ¾" BSP, 24Vac coil |
| **VS-VMR-03-LV** | 1" BSP, 24Vac coil |
| **VS-VMR-04-LV** | 1¼" BSP, 24Vac coil |
| **VS-VMR-05-LV** | 1½" BSP, 24Vac coil |
| **VS-VMR-06-LV** | 2" BSP, 24Vac coil |
| **VS-VMR-01** | ½" BSP, 230Vac coil |
| **VS-VMR-02** | ¾" BSP, 230Vac coil |
| **VS-VMR-03** | 1" BSP, 230Vac coil |
| **VS-VMR-04** | 1¼" BSP, 230Vac coil |
| **VS-VMR-05** | 1½" BSP, 230Vac coil |
| **VS-VMR-06** | 2" BSP, 230Vac coil |

Flanged valves:

| | |
|---|---|
| **VS-VMR-07** | 65mm PN16, 230Vac coil |
| **VS-VMR-08** | 80mm PN16, 230Vac coil |
| **VS-VMR-09** | 100mm PN16, 230Vac coil |
| **VS-VMR-10** | 125mm PN16, 230Vac coil |
| **VS-VMR-12** | 150mm PN16, 230Vac coil |

Accessory:

| | |
|---|---|
| **VS-PCS** | CPI kit for 65-150mm valves |

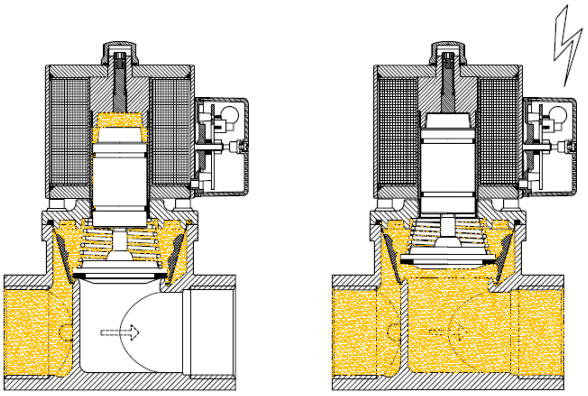
# Function & Application

The VS-VMR type valve is a safety shutting device using auxiliary power supply.

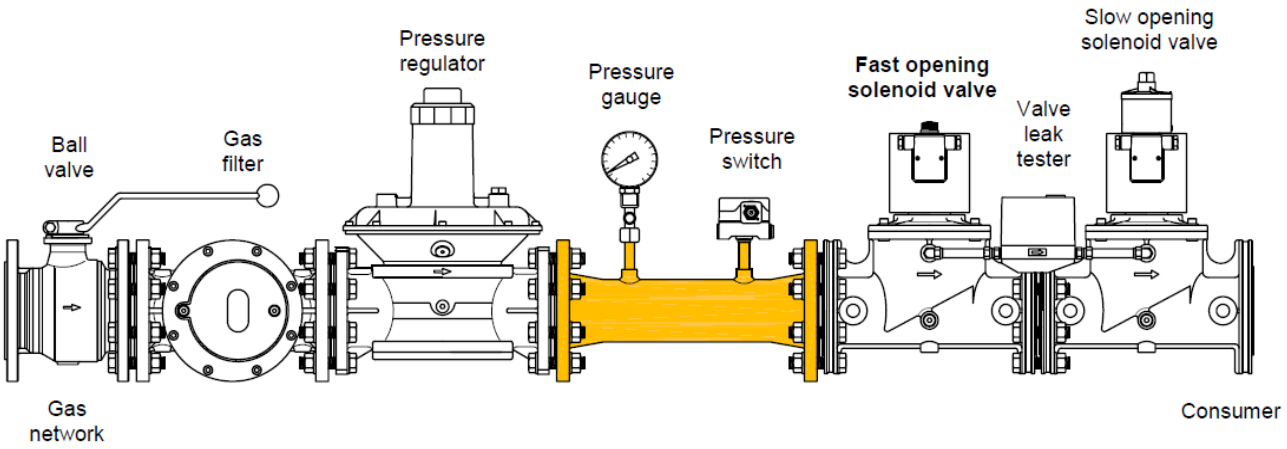
When it is de-energized, the spring pushes on the seal disc, keeping the gas passage closed. Now, the inlet chamber is under the gas line pressure which forces on the disc, increasing the closing function and improving the seal.

When the coil is powered the valve opens rapidly, against the strength of the spring and gas pressure. The flow may be adjusted using the regulating screw on the top (see the installation and service instructions).

If the power supply is shut off, the valve rapidly closes, interrupting the gas flow.



This kind of valve is normally installed as safety and regulating device in gas trains, for industrial applications and gas firing systems. An example of installation:

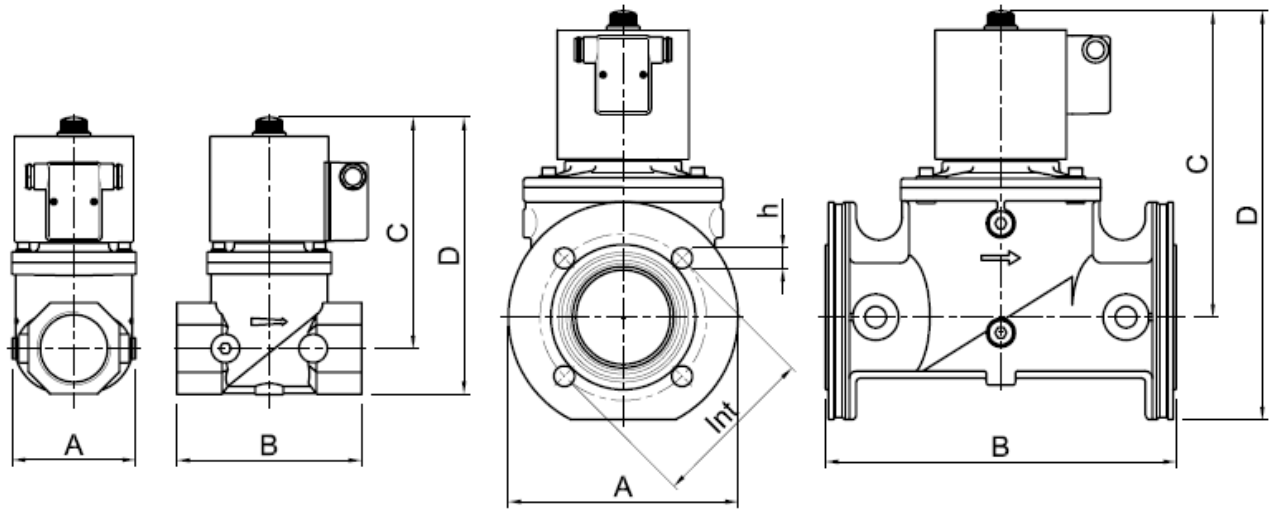


# Design, Installation & Servicing

To assure a proper and safe operation, as well as a long service life of the valve, consider the following recommendations during the design of the system where the valve will be installed:

- Ensure that all the features of your system comply with the specifications of the valve (gas type, operating pressure, flow rate, ambient temperature, electrical voltage, etc.).
- Valve may be mounted with coil in horizontal or vertical position, not upside down. Coil may be oriented 360 degrees in any direction.
- In the event of vertical pipe, the flow direction should be from bottom to top.
- After removing the end caps make sure no foreign body will enter into the valve during handling or installation (e.g. swarf or excessive sealing agent).
- A gas filter should be always installed upstream the valve.
- Ensure that installing area is protected from rain and water splashes or drops.
- Perform leak and functional tests after mounting (max. testing pressure 1,5 Pmax).
- The continuous service (100% ED) causes inevitable coil heating, depending on working environment. Never install the valve close to walls or other equipment's. To improve the coil cooling, install the valve allowing free air circulation.
- From VS-VMR-09 to VS-VMR-12, in order to reset the electronic board, there must be a period of 5 seconds between switching the valve off and on again.
- Perform maintenance according to service instructions at least once a year (most often for aggressive gases).
- Due to seals aging, to ensure safe operation, we recommend the valve replacement after 10 years from the date of manufacture stamped on the product.
- This control must be installed in compliance with the rules in force.
- Make sure all works are performed by qualified technicians only and in compliance with local and national codes.
- To prevent product damage and dangerous situations, read carefully the instructions supplied with the product before use.

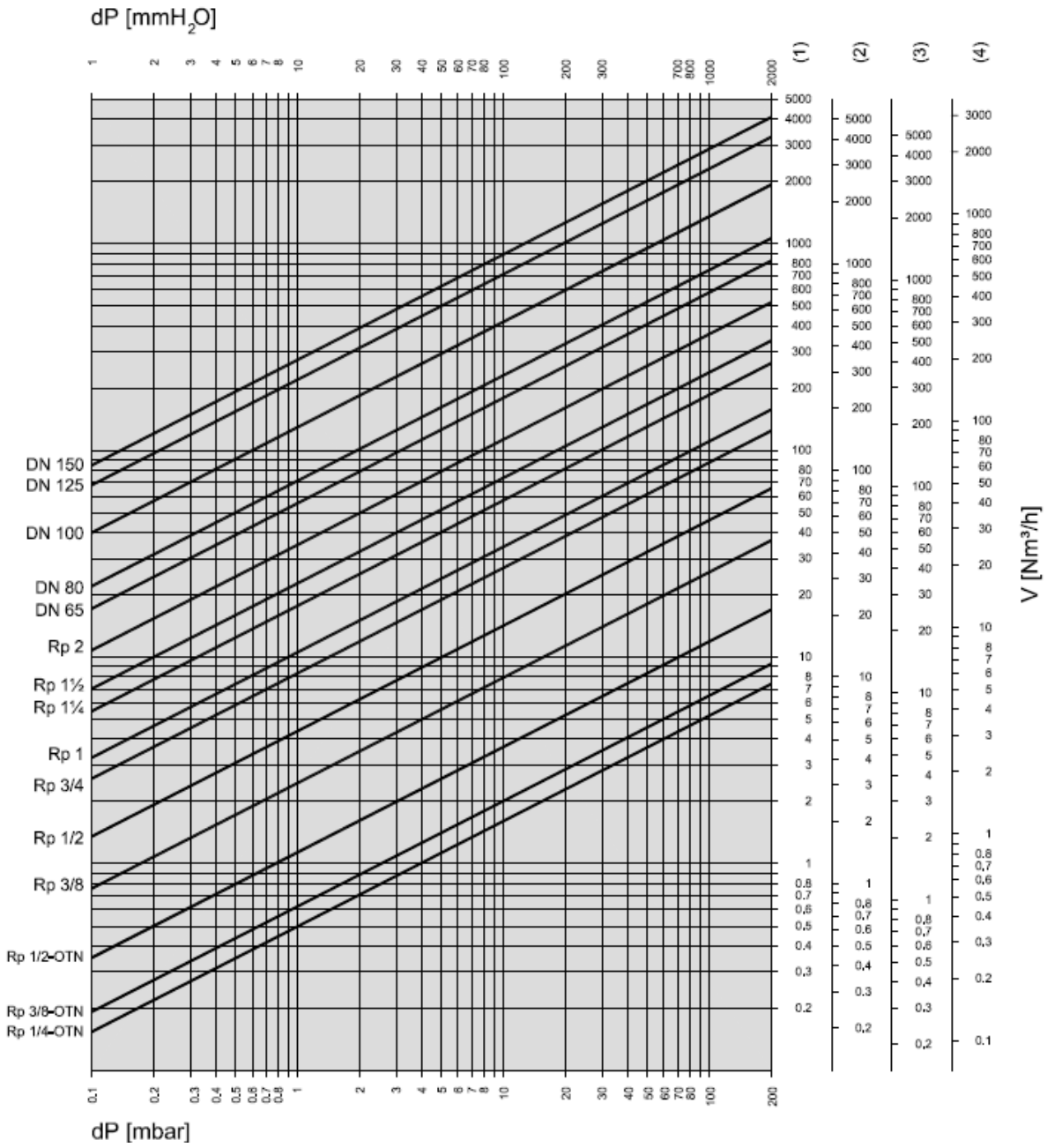
# Power Consumption, Dimensions & Weights




| Connection DN | Power consumption (VA/W) | Flow Factor (m³/h) | Dimensions A | B | C | D | Int | h | Weight (Kg) |
|---|---|---|---|---|---|---|---|---|---|
| Screwed ½" | 25 | 4.8 | 88 | 77 | 126 | 142 | | | 1.4 |
| Screwed ¾" | 25 | 9.5 | 88 | 96 | 145 | 168 | | | 2.5 |
| Screwed 1" | 25 | 12 | 88 | 96 | 145 | 168 | | | 2.5 |
| Screwed 1 ¼" | 30/120[3] | 20 | 120 | 153 | 191 | 224 | | | 5.7 |
| Screwed 1 ½" | 30/120[3] | 26 | 120 | 153 | 191 | 224 | | | 5.7 |
| Screwed 2" | 30/120[3] | 40 | 106 | 156 | 195 | 234 | | | 6 |
| Flanged 65 | 45/180[3] | 65 | 200 | 305 | 266 | 355 | 145 | 4x18 | 14 |
| Flanged 80 | 45/180[3] | 80 | 200 | 305 | 266 | 355 | 160 | 8x18 | 14 |
| Flanged 100 | 70/280[3] | 148 | 250 | 350 | 352 | 452 | 180 | 8x18 | 33 |
| Flanged 125 | 80/320[3] | 250 | 310 | 460 | 430 | 600 | 210 | 8x18 | 58 |
| Flanged 150 | 80/320[3] | 315 | 310 | 460 | 430 | 600 | 240 | 8x23 | 60 |

[3] Working/Starting

# Gas Flow Chart:




(1) Air
(2) Natural Gas
(3) Town Gas
(4) LPG

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# Flow Data:

When the flow read on the diagram is referred to operating pressure instead of standard conditions, the pressure drop Δp read on the diagram must be multiplied for the factor:
(1+ relative pressure in bar)

*Example:*
In the 2" solenoid valve with an air flow of 80 Nm3/h there is a pressure drop Δp = 5 mbar.
If we consider that 80 m3/h is the flow at 200 mbar of inlet pressure, then the pressure drop to be consider is:

Δp = 5x(1+0,2) = 6 mbar

Normally, pressure drop and flow rate for the valves are read from the gas flow diagram.
However, the valves can also be chosen in accordance with the characteristic "Kvs value" which his shown on page 6.
The selection of the valve requires the calculation of the Kv under the operating conditions.

Considering only subcritical pressure drops:

$$\Delta p < \frac{p_1}{2}$$

Kv can be calculated with the formula:

$$Kv = \frac{V}{514}\sqrt{\frac{\rho(t+273)}{\Delta p \cdot p_2}}$$

Where

V = flow rate [Nm³/h]
Kv = flow factor [m³/h]
$\rho$ = density [Kg/m³]
p1 = absolute inlet pressure [bar]
p2 = absolute outlet pressure [bar]
Δp = differential pressure p1-p2 [bar]
t = media temperature [°C]
To the Kv value calculated from operating conditions we add an allowance of 20%, to obtain the minimum Kvs value which the valve should have:

**Kvs > 1,2 Kv**

Valve must be selected considering the following:

- Pressure drops Δp ≤ 0,1p1 are recommended and Δp > p1/2 are always unadvisable
- Flow velocities w ≤ 15 m/s are recommended and w > 50 m/s are always unadvisable.

# Differential Pressure Sensors

## Features

- Suitable for water, steam (with pigtail) or air
- Robust construction
- 6mm Compression pressure connections

## Specification

| | |
|---|---|
| Output: | |
| PL-692-x | 4-20mA (2-wire loop powered) |
| PL-6912-x-V | 0-10Vdc |
| Supply voltage: | |
| 4-20mA | 11 to 33Vdc |
| 0-10Vdc | 18 to 33Vdc or 24Vac ±15% |
| Load: | |
| 4-20mA | $\leq \frac{\text{Supply voltage} - 11V}{0.02A}$ (Ohm) |
| 0-10Vdc | >10Kohm |
| Current consumption: | |
| 4-20mA | <25mA |
| 0-10vdc | <5mA |
| Electrical connections | DIN EN175301-803 |
| Accuracy (total Linearity, hysteresis & repeatability) : | |
| ±1.3% Full scale @ 2 x nominal pressure | |
| ±0.8% Full scale @ 3 x nominal pressure | |
| ±0.5% Full scale @ 5 x nominal pressure | |
| Response time | <5ms |
| Overload | See page 2 |
| Materials in contact | Cermic / stainless steel 1.4305 |
| with the medium | EPDM seal |
| Load cycle | <50Hz |
| Temperature: | |
| Media | -15 to +80°C |
| Ambient | -15 to +80°C |
| Dimensions | 130 x 40mm |
| Pressure connections | 6mm Compression |
| Protection | IP65 |
| CE Conformity: | |
| | EN 61000-6-2, EN 61000-6-3 |
| | EMC, CE Marked |
| Country of origin | Switzerland |

## Product Codes

**4-20mA Output:**

**PL-692-0.1**
Liquid differential pressure transmitter 0-100 mbar

**PL-692-0.2**
Liquid differential pressure transmitter 0-200 mbar

**PL-692-0.4**
Liquid differential pressure transmitter 0-400 mbar

**PL-692-1**
Liquid differential pressure transmitter 0-1 bar

**PL-692-2.5**
Liquid differential pressure transmitter 0-2.5 bar

**PL-692-4**
Liquid differential pressure transmitter 0-4 bar

**PL-692-6**
Liquid differential pressure transmitter 0-6 bar

**PL-692-10**
Liquid differential pressure transmitter 0-10 bar

**PL-692-16**
Liquid differential pressure transmitter 0-16 bar

**0-10Vdc Output:**

**PL-692-0.1-V**
Liquid differential pressure transmitter 0-100 mbar

**PL-692-0.2-V**
Liquid differential pressure transmitter 0-200 mbar

**PL-692-0.4-V**
Liquid differential pressure transmitter 0-400 mbar

**PL-692-1-V**
Liquid differential pressure transmitter 0-1 bar

**PL-692-2.5-V**
Liquid differential pressure transmitter 0-2.5 bar

**PL-692-4-V**
Liquid differential pressure transmitter 0-4 bar

**PL-692-6-V**
Liquid differential pressure transmitter 0-6 bar

**PL-692-10-V**
Liquid differential pressure transmitter 0-10 bar

**PL-692-16-V**
Liquid differential pressure transmitter 0-16 bar

## Technical Overview

The PL-692 range of differential pressure transmitters are suitable for use with liquids and non-aggressive gases.
With unique ceramic sensing technology for no mechanical aging and creepage.
The sensor and transmitter are housed in a robust stainless steel casing with a DIN standard electrical connector, sealed for IP65 protection.

## Installation

1. Fix the transmitter to the system pipe using the 6mm compression connectors on both low and high pressure ports.

2. You should avoid mounting the transmitter where it will be subjected to mechanical vibration.

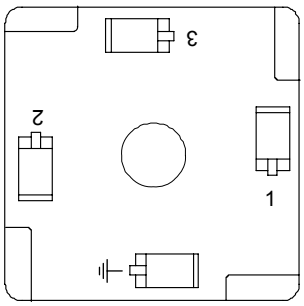
3. The sensor can be mounted in any orientation if the temperature is between -15 to +80°C.

4. Remove the DIN connector.

5. Expose the electrical terminals feed cable through the cable gland and connected as required( see connections below).

6. Re-fit connector to transmitter.

## Connections




**PL-692-x (4-20mA):**

Terminal 1 11 - 33Vdc
Terminal 2 4-20mA signal

**PL-692-x-V (0-10Vdc):**

Terminal 1 24Vac±15% or 18 - 33Vdc
Terminal 2 0-10Vdc signal
Terminal 3 0V (Ground)

## Maximum Differential Pressure

| | Overload 1 side (max.) | |
|---|---|---|
| | P1 (+) | P2 (-) |
| PL-692-0.1 | 0.6 bar | 0.6 bar |
| PL-692-0.2 | 0.12 bar | 0.12 bar |
| PL-692-0.4 | 2 bar | 2 bar |
| PL-692-1 | 5 bar | 5 bar |
| PL-692-2.5 | 12 bar | 12 bar |
| PL-692-4 | 12 bar | 12 bar |
| PL-692-6 | 12 bar | 12 bar |
| PL-692-10 | 20 bar | 12 bar |
| PL-692-16 | 32 bar | 12 bar |

## Trend Scaling

4-20mA output transmitters:

| | Trange | Brange | Upper | Lower | Exp |
|---|---|---|---|---|---|
| PL-692-0.1 | 0.1 | -0.15 | 0.1 | 0 | 2 |
| PL-692-0.2 | 0.2 | -0.3 | 0.2 | 0 | 2 |
| PL-692-0.4 | 0.4 | -0.6 | 0.4 | 0 | 2 |
| PL-692-1 | 1 | -1.5 | 1 | 0 | 2 |
| PL-692-2.5 | 2.5 | -3.75 | 2.5 | 0 | 2 |
| PL-692-4 | 4 | -6 | 4 | 0 | 2 |
| PL-692-6 | 6 | -9 | 6 | 0 | 2 |
| PL-692-10 | 10 | -15 | 10 | 0 | 2 |
| PL-692-16 | 16 | -24 | 16 | 0 | 2 |

0-10Vdc output transmitters:

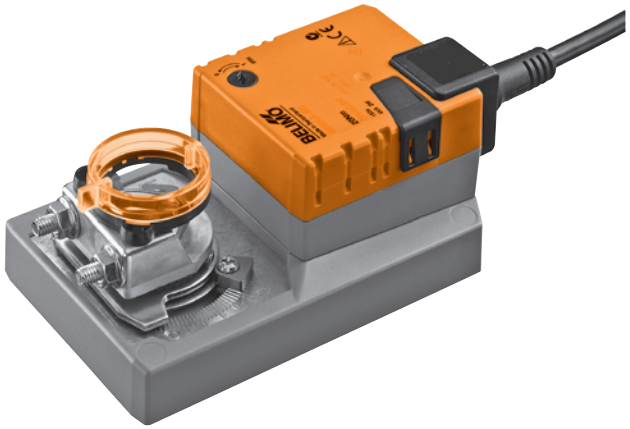
| | Trange | Brange | Upper | Lower | Exp |
|---|---|---|---|---|---|
| PL-692-0.1-V | 0.1 | -0.1 | 0.1 | 0 | 2 |
| PL-692-0.2-V | 0.2 | -0.2 | 0.2 | 0 | 2 |
| PL-692-0.4-V | 0.4 | -0.4 | 0.4 | 0 | 2 |
| PL-692-1-V | 1 | -1 | 1 | 0 | 2 |
| PL-692-2.5-V | 2.5 | -2.5 | 2.5 | 0 | 2 |
| PL-692-4-V | 4 | -4 | 4 | 0 | 2 |
| PL-692-6-V | 6 | -6 | 6 | 0 | 2 |
| PL-692-10-V | 10 | -10 | 10 | 0 | 2 |
| PL-692-16-V | 16 | -16 | 16 | 0 | 2 |

BELIMO

# Technical data sheet SM24A-SR

**Modulating damper actuator for adjusting air dampers in ventilation and air-conditioning systems for building services installations**

- **For air dampers up to approx. 4 m²**
- **Torque 20 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control: Modulating DC 0 ... 10 V**
- **Position feedback DC 2 ... 10 V**



## Technical data

| | | | |
|---|---|---|---|
| **Electrical data** | Nominal voltage | | AC 24 V, 50/60 Hz / DC 24 V |
| | Nominal voltage range | | AC 19.2 ... 28.8 V / DC 21.6 ... 28.8 V |
| | Power consumption | In operation | 2 W @ nominal torque |
| | | At rest | 0.4 W |
| | | For wire sizing | 4 VA |
| | Connection | | Cable 1 m, 4 x 0.75 mm² |
| **Functional data** | Torque (nominal torque) | | Min. 20 Nm @ nominal voltage |
| | Control | Control signal Y | DC 0 ... 10 V, typical input impedance 100 kΩ |
| | | Operating range | DC 2 ... 10 V |
| | Position feedback (Measuring voltage U) | | DC 2 ... 10 V, max. 1 mA |
| | Position accuracy | | ±5% |
| | Direction of rotation | | Reversible with switch 0 / 1 |
| | Direction of motion at Y = 0 V | | In switch position 0 ↶ resp. 1 ↷ |
| | Manual override | | Gearing latch disengaged with pushbutton, can be locked |
| | Angle of rotation | | Max. 95°∢, can be limited at both ends with adjustable mechanical end stops |
| | Running time | | 150 s / 90°∢ |
| | Sound power level | | Max. 45 dB (A) |
| | Position indication | | Mechanical, pluggable |
| **Safety** | Protection class | | **III** Safety extra-low voltage / UL Class 2 Supply |
| | Degree of protection | | IP54 in any mounting position<br>NEMA 2, UL Enclosure Type 2 |
| | EMC | | CE according to 2004/108/EC |
| | Certification | | cULus according to UL 60730-1A and UL 60730-2-14 and CAN/CSA E60730-1:02<br>Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14 |
| | Mode of operation | | Type 1 |
| | Rated impulse voltage | | 0.8 kV |
| | Control pollution degree | | 3 |
| | Ambient temperature range | | –30 ... +50°C |
| | Non-operating temperature | | –40 ... +80°C |
| | Ambient humidity range | | 95% r.h., non-condensating |
| | Maintenance | | Maintenance-free |
| **Dimensions / Weight** | Dimensions | | See «Dimensions» on page 2 |
| | Weight | | Approx. 1.05 kg |

## Safety notes

⚠

- **The actuator is not allowed to be used outside the specified field of application, especially in aircraft or any other form of air transport.**
- **Assembly must be carried out by trained personnel. Any legal regulations or regulations issued by authorities must be observed during assembly.**
- **The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.**
- **The cable must not be removed from the device.**
- **When calculating the required torque, the specifications supplied by the damper manufacturers (cross section, design, installation site), and the air flow conditions must be observed.**

## Safety notes

*(Continued)*

- **The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.**

## Product features

**Mode of operation**
The actuator is controlled with a standard modulating signal of DC 0 ... 10 V and travels to the position defined by the control signal. Measuring voltage U serves for the electrical display of the damper position 0 ... 100% and as slave control signal for other actuators.

**Simple direct mounting**
Simple direct mounting on the damper spindle with a universal spindle clamp, supplied with an anti-rotation strap to prevent the actuator from rotating.

**Manual override**
Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).

**Adjustable angle of rotation**
Adjustable angle of rotation with mechanical end stops.

**High functional reliability**
The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.

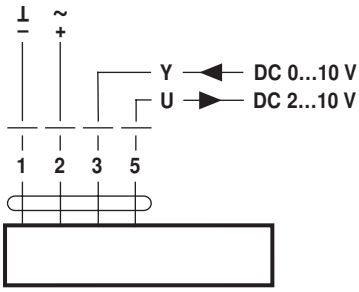
## Accessories

| | Description | Data sheet |
|---|---|---|
| **Electrical accessories** | Auxiliary switch S..A.. | T2 - S..A.. |
| | Feedback potentiometer P..A.. | T2 - P..A.. |
| | Range controller SBG24 | T2 - SBG24 |
| | Position sensor SGA24, SGE24 and SGF24 | T2 - SG..24 |
| | Digital position indication ZAD24 | T2 - ZAD24 |
| **Mechanical accessories** | Various accessories (clamps, shaft extensions etc.) | T2 - Z-SM..A.. |

## Electrical installation

**Wiring diagram**

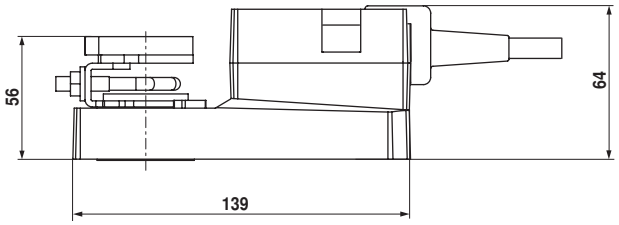
**Notes**
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

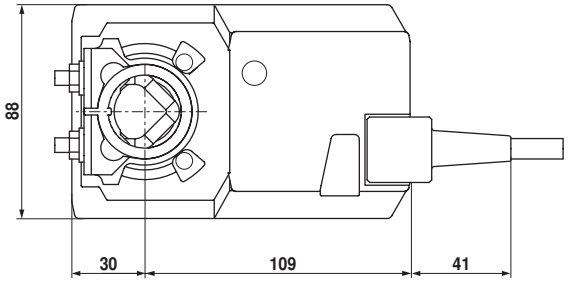



**Cable colours:**
1 = black
2 = red
3 = white
5 = orange

## Dimensions [mm]

**Dimensional drawings**



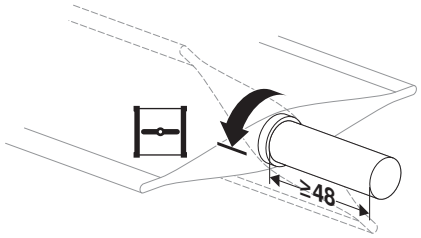




| Damper spindle | Length | | | |
|---|---|---|---|---|
| | ≥48 | 10 ... 20 [1] | ≥10 | ≤20 |
| | ≥20 | 10 ... 20 [1] | ≥10 | ≤20 |

[1] CrNi (INOX) 12 ... 20

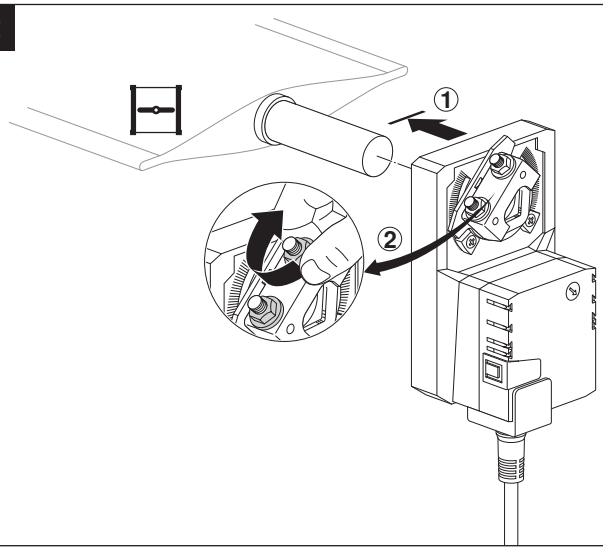
70214-00003.F

**1**




| | ● ↕ | ■ ↕ | ◆ ↕ |
|---|---|---|---|
| | 10 ... 20 | ≥10 | ≤20 |
| CrNi (INOX) | 12 ... 20 | ≥10 | ≤20 |

**2**

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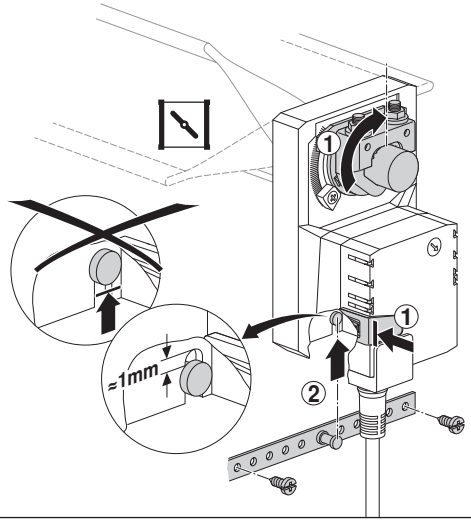
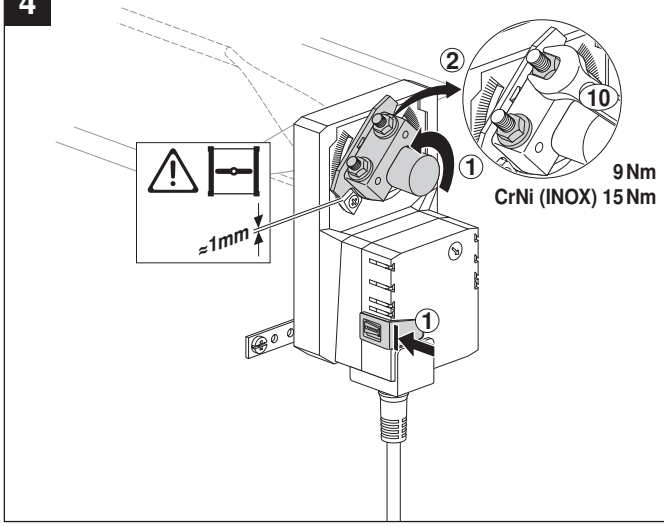
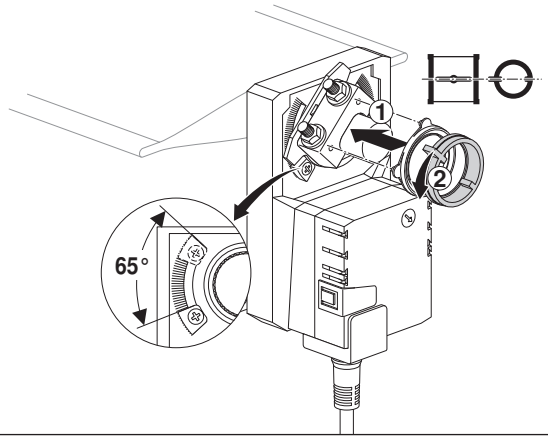
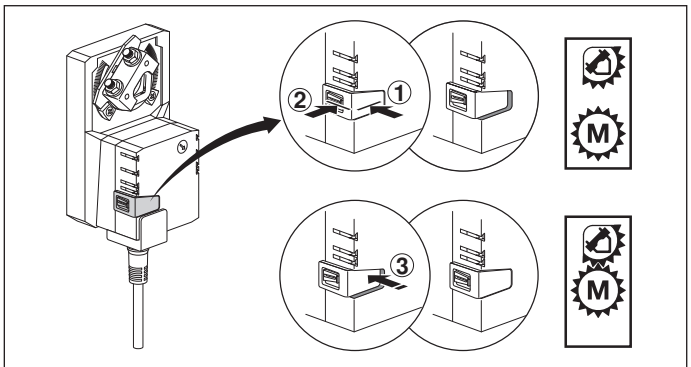


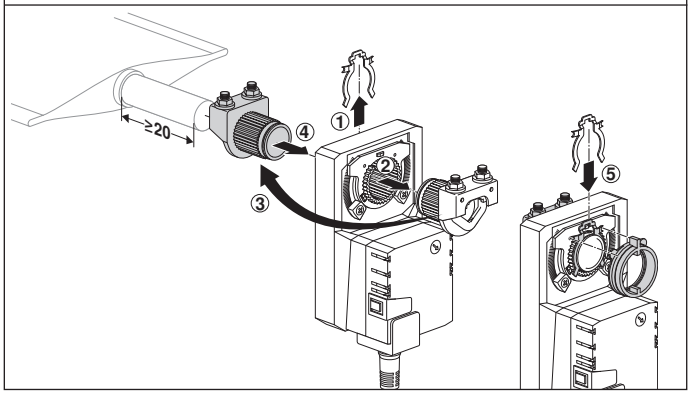

**4**

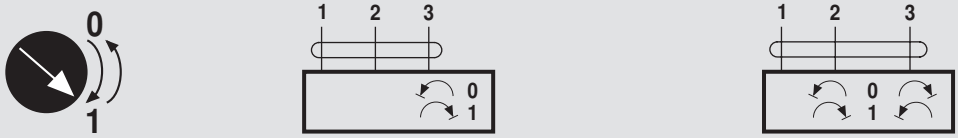


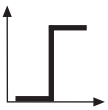

**5**



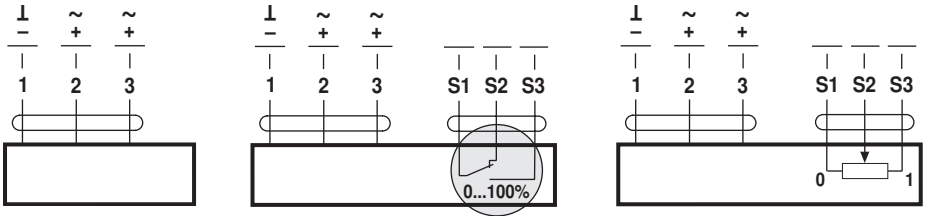





**AC 24 V / DC 24 V**

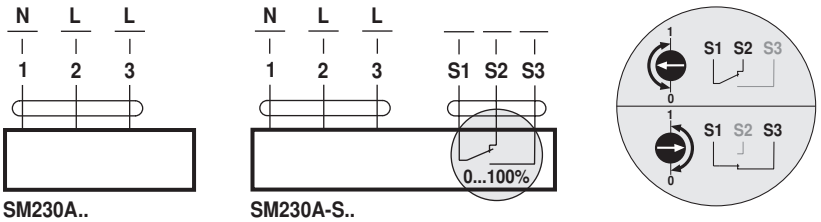



SM24A..
SMD24A..

SM24A-S..

SM24AP5..

**AC 100 ... 240 V** ⚠




SM230A..
SMD230A..

SM230A-S..

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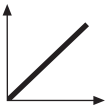
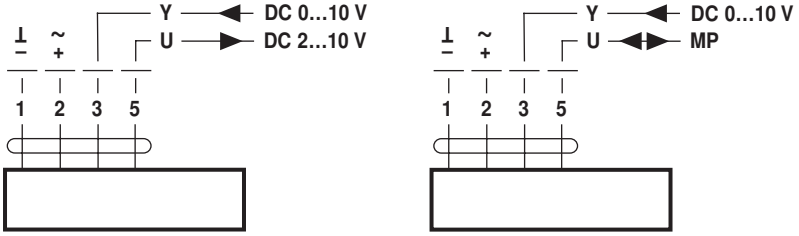


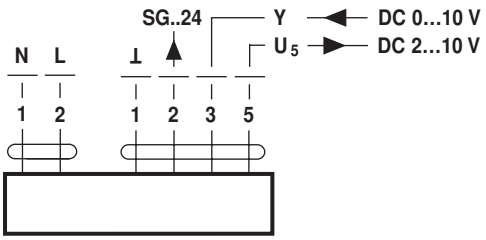
**AC 24 V / DC 24 V**




SM24A-SR..
SM24A-MF..

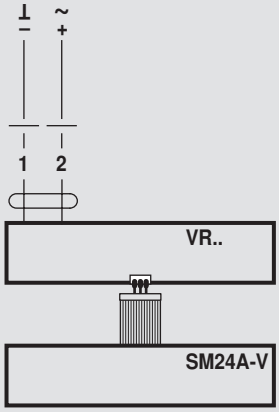
SM24A-MP..

**AC 100 ... 240 V** ⚠




SM230ASR..

**AC 24 V / DC 24 V**
(SM24A-V / VR..)




SM24A-V / VR..

**Auxiliary switches,**
**suitable for all damper actuators**
**LM..A.., NM..A.., SM..A.. and GM..A..**

- **1 or 2 switches**
  **(SPDT, single-pole double-throw)**
- **Adjustable switching point**

## Overview of types

| | Type | No. of switches | Cable | Type | No. of switches | Cable |
|---|---|---|---|---|---|---|
| **Housing color: orange** | S1A | 1 x SPDT | 1 m, 3 x 0.75 mm² | S2A | 2 x SPDT | 1 m, 6 x 0.75 mm² |
| | S1A/300 | 1 x SPDT | 3 m, 3 x 0.75 mm² | S2A/300 | 2 x SPDT | 3 m, 6 x 0.75 mm² |
| | S1A/500 | 1 x SPDT | 5 m, 3 x 0.75 mm² | S2A/500 | 2 x SPDT | 5 m, 6 x 0.75 mm² |
| **Housing color: gray** | S1A GR | 1 x SPDT | 1 m, 3 x 0.75 mm² | S2A GR | 2 x SPDT | 1 m, 6 x 0.75 mm² |
| | S1A/300 GR | 1 x SPDT | 3 m, 3 x 0.75 mm² | S2A/300 GR | 2 x SPDT | 3 m, 6 x 0.75 mm² |
| | S1A/500 GR | 1 x SPDT | 5 m, 3 x 0.75 mm² | S2A/500 GR | 2 x SPDT | 5 m, 6 x 0.75 mm² |

## Technical data

| | | |
|---|---|---|
| **Functional data** | No. of switches | See «Overview of types» |
| | Switching capacity | 1 mA ... 3 (0.5) A, AC 250 V ⧈ |
| | Switching point | Adjustable over the full range of rotation of the damper actuator (0 ... 1). Can be preset by means of the scale. |
| | Connection | See «Overview of types» |
| **Safety** | Protection class | **II** Totally insulated ⧈ |
| | Degree of protection | IP54 |
| | LV Directive | CE according to 73/23/EEC |
| | Mode of operation | Type 1.B (to EN 60730-1) |
| | Ambient temperature range | –30 ... +50°C |
| | Non-operating temperature | –40 ... +80°C |
| | Ambient humidity range | 95% r.H., non-condensating (EN 60730-1) |
| | Maintenance | Maintenance-free |
| **Dimensions / Weight** | Dimensions (L x W x H) | 101 x 76 x 27 mm |
| | Weight | S1A: Approx. 130 g<br>S2A: Approx. 170 g |

## Safety notes

- **The auxiliary switches are not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.**
- **Assembly must be carried out by trained personnel. Any legal regulations or regulations issued by authorities must be observed during assembly.**
- **The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.**
- **The cable must not be removed from the device.**
- **The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.**

## Product features

**Application**

S1A.. and S2A.. auxiliary switches are used to signal positions or to execute switching functions in any angular position.

**Mode of operation**

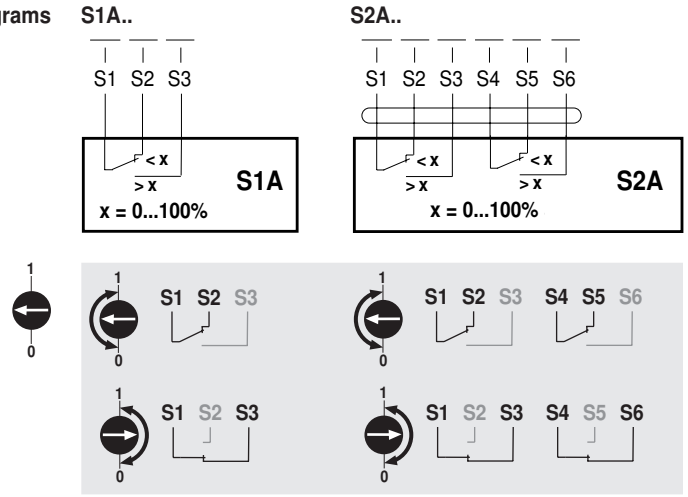
A form-fit engagement is created between a driver disc and the clamp, causing the position to be directly transferred to the trip cams of the microswitches.
The switching points can be freely selected within the specified range of rotation by means of a dial. The current switch position can be read at any time.

**Mounting**

The auxiliary switches are attached directly to the clamp of the damper actuator. The guiding grooves between the housing and the switch ensure a tightly sealing fit.

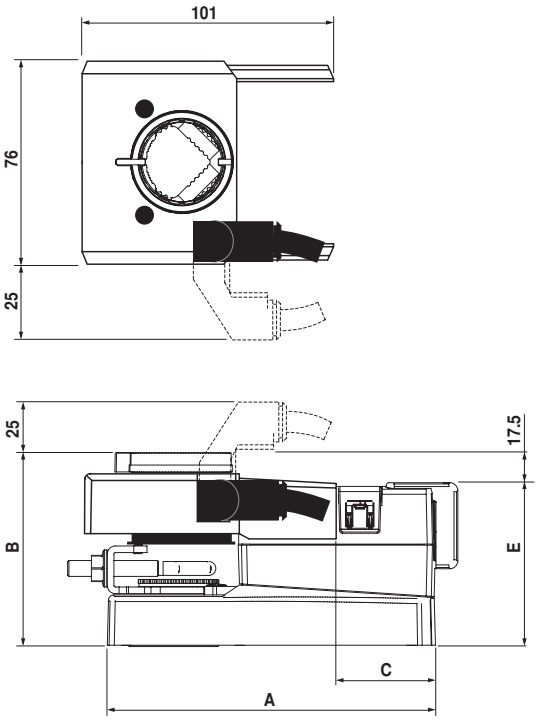
## Electrical installation

**Wiring diagrams**




## Dimensions [mm]

**Dimensional diagrams**

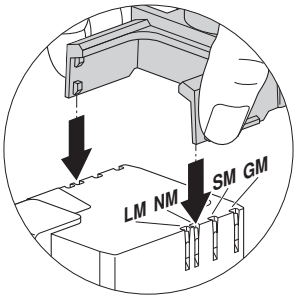


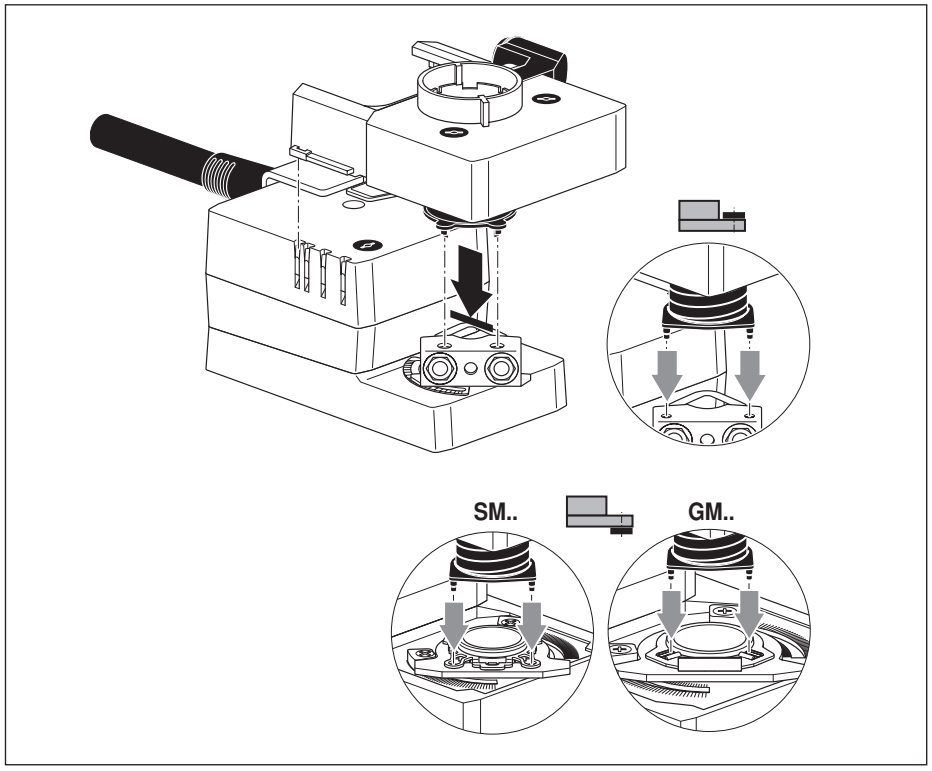

| with actuator | A | B | C | E |
|---|---|---|---|---|
| LM..A.. | 116 | 76.5 | 36 | 59 |
| NM..A.. | 124 | 77.5 | 41 | 60 |
| SM..A.. | 139 | 79.5 | 51 | 62 |
| GM..A.. | 179 | 85.5 | 62.5 | 68 |



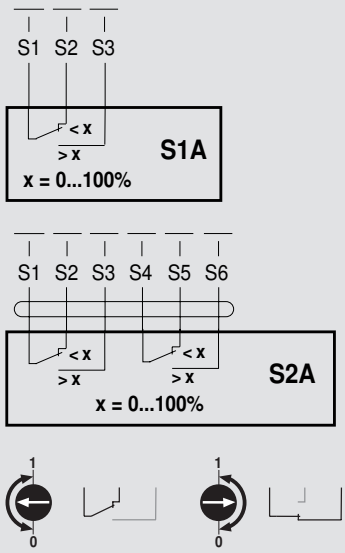
Data sheet T2-S..A. • en • v1.1 • 01.2006 • Subject to modifications

70153-00001.I

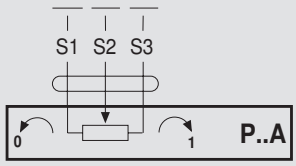


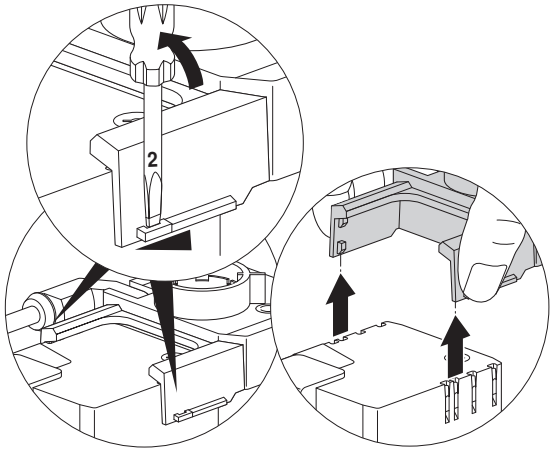




**S..A..**

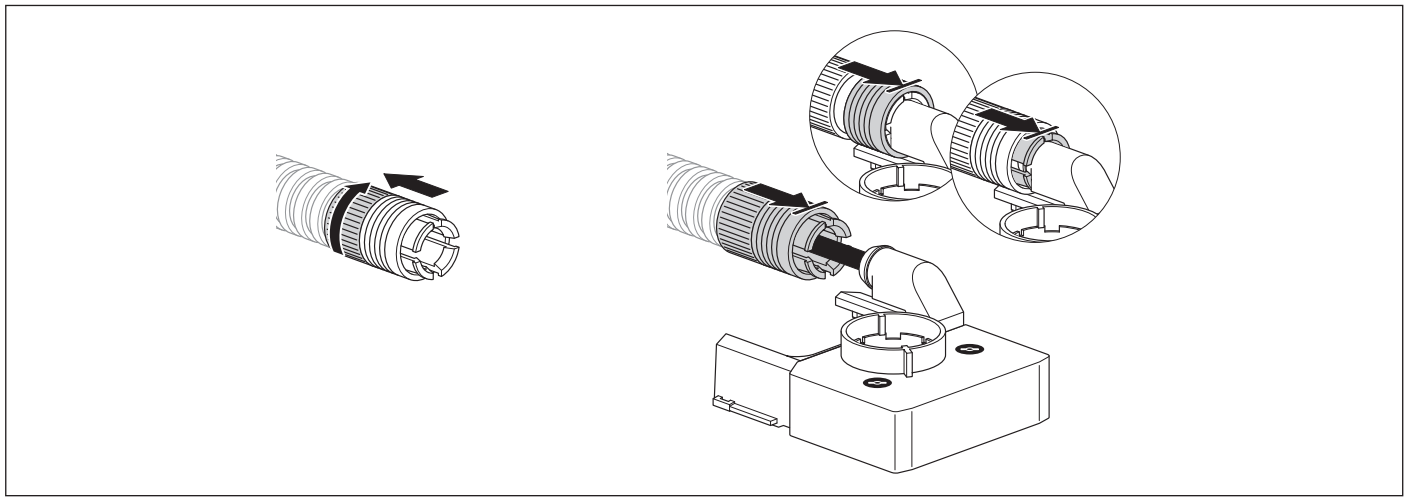


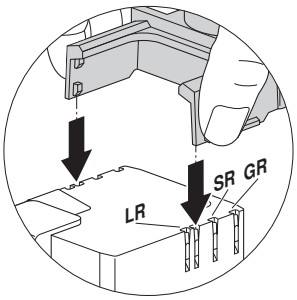

**P..A..**

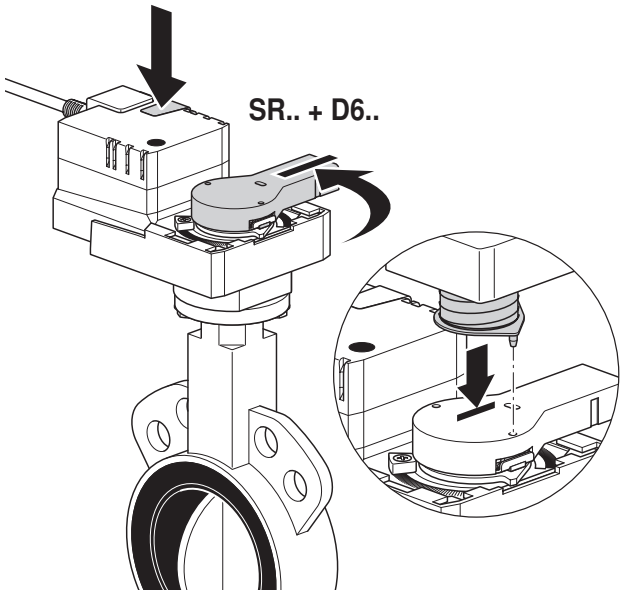


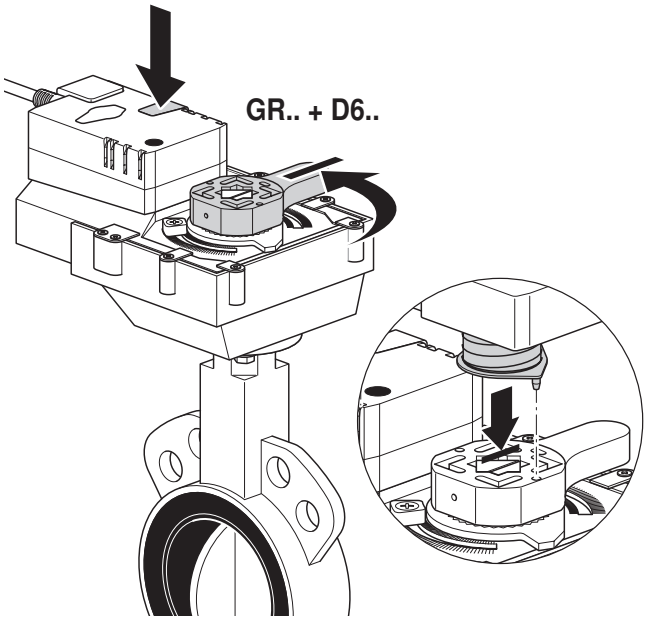



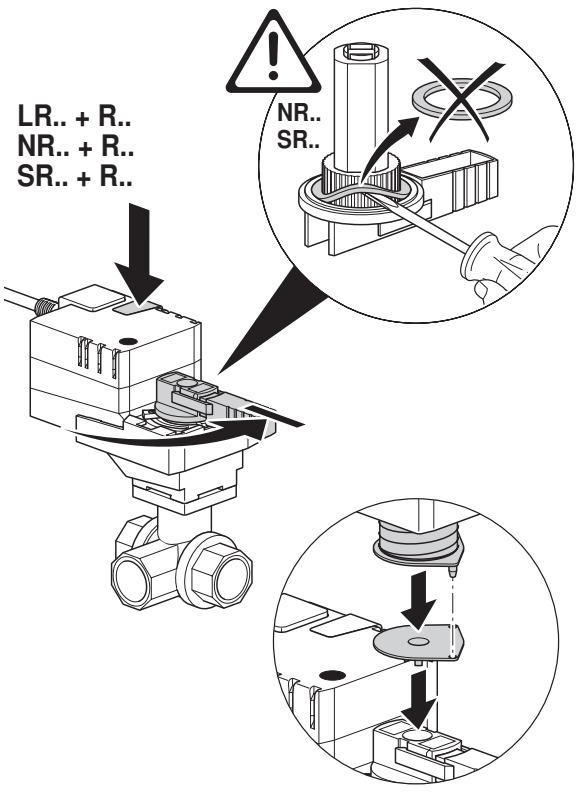

**10040-00001**

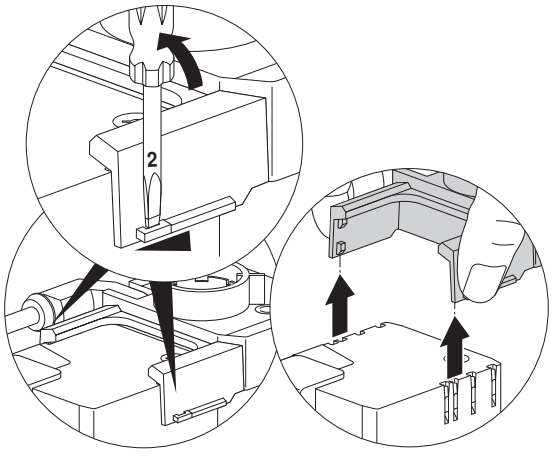



LR
SR GR

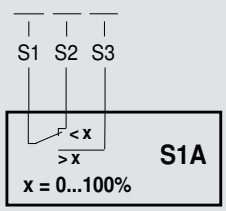

SR.. + D6..


GR.. + D6..

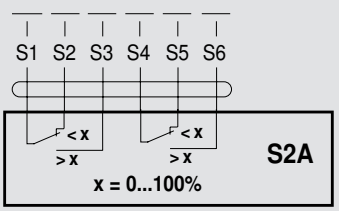

LR.. + R..
NR.. + R..
SR.. + R..
NR..
SR..


2

**S1A..**


S1 S2 S3
< x
> x
S1A
x = 0...100%

**S2A..**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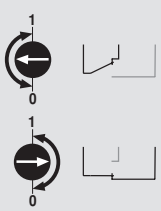
< x
> x
< x
> x
S2A
x = 0...100%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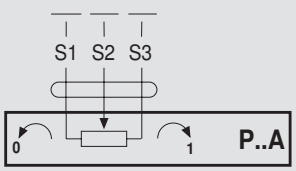
**P..A..**


S1 S2 S3
0
1
P..A

# DN 25 – 450

| | |
|---|---|
| Pipe connection | Flange (ISO 7005-2 and EN 1092-2) |
| Medium temperature | –20...+120 °C |
| Leakage rate | A, tight (EN 12266-1) |
| PN 6, 10, 16 | DN 25 – 200 |
| PN 10, 16 | DN 250 – 350 |
| PN 16 | DN 400 – 450 |

Closed and open water circuit (pH >7)

**With wafer type**

Closed and open water circuit (pH >7)

**With lug type**

| DN 25 | | DN 32 | | DN 40 | | DN 50 | |
|---|---|---|---|---|---|---|---|
| $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type |
| 45 | D625N | 55 | D632N | 70 | D640N | 90 | D650N |
| 45 | D625NL | 55 | D632NL | 70 | D640NL | 90 | D650NL |

| DN 65 | | DN 80 | | DN 100 | | DN 125 | | DN 150 | | DN 200 | | DN 250 | | DN 300 | | DN 350 | | DN 400 | | DN 450 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type | $k_{vmax}$ [m³/h] | BV type |
| 180 | D665N | 300 | D680N | 580 | D6100N | 820 | D6125N | 1600 | D6150N | 2900 | D6200N | 4400 | D6250N | 7300 | D6300N | 10900 | D6350N | 14200 | D6400N | 18800 | D6450N |
| 180 | D665NL | 300 | D680NL | 580 | D6100NL | 820 | D6125NL | 1600 | D6150NL | 2900 | D6200NL | 4400 | D6250NL | 7300 | D6300NL | 10900 | D6350NL | 14200 | D6400NL | 18800 | D6450NL |

## Suitable actuators

| Nominal torque | Open-close | 3-point | Terminal connection | Emergency control function | Nominal voltage 24 V AC/DC 230 V AC | | Running time motor 90° | Auxiliary switch SPDT | Actuator type open-close / 3-point | Modulating (2 – 10 V) | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Standard actuators** | | | | | | | | | | | | | | |
| 20 Nm | • | • | | | 24 V | 90 s | | | SR24A-5 | SR24A-SR-5 | 1200 | 1200 | 1200 | 1200 |
| | | | | | 230 V | | | | SR230A-5 | SR230A-SR-5 | 1200 | 1200 | 1200 | 1200 |
| 40 Nm | • | | | | 24 V | 150 s | | | GR24A-5 | GR24A-SR-5 | 1200 | 1200 | 1200 | 1200 |
| | | | | | 230 V | | | | GR230A-5 | | 1200 | 1200 | 1200 | 1200 |
| <90 Nm | • | | | | 24 V | 150 s | | | DR24A-5 | DR24A-SR-5 | | | | |
| | | | | | 230 V | | | | DR230A-5 | | | | | |
| | | | | | 24 V | | | | DR24A-7 | DR24A-SR-7 | | | | |
| | | | | | 230 V | | | | DR230A-7 | | | | | |
| | | | • | | 24 V | | | | DR24A-TP-7 | | | | | |
| **Fast runners** | | | | | | | | | Actuator type open-close / 3-point | Modulating (2 – 10 V) | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] |
| | | | | | 230 V | | 2 | | SY1-230-3-T | | 1200 | 1200 | 1200 | 1200 |
| 40 Nm | • | | | | 24 V | 35 s | | | GRC24A-5 | | | | | |
| | | | | | | | | | DRC24A-5 | | | | | |
| <90 Nm | • | | | | 24 V | 35 s | | | DRC24A-7 | | | | | |
| 90 Nm | • | • | • | | 24 V | 15 s | 2 | | SY2-24-3-T | SY2-24-SR-T | | | | |
| | | | | | 230 V | 17 s | 2 | | SY2-230-3-T | SY2-230-SR-T | | | | |
| 150 Nm | • | • | • | | 24 V | 22 s | 2 | | SY3-24-3-T | SY3-24-SR-T | | | | |
| | | | | | 230 V | 26 s | 2 | | SY3-230-3-T | SY3-230-SR-T | | | | |
| 400 Nm | • | • | • | | 24 V | 16 s | 2 | | SY4-24-3-T | SY4-24-SR-T | | | | |
| | | | | | 230 V | 18 s | 2 | | SY4-230-3-T | SY4-230-SR-T | | | | |
| 650 Nm | • | • | • | | 230 V | 31 s | 2 | | SY6-230-3-T | | | | | |
| 1000 Nm | • | • | • | | 230 V | 55 s | 2 | | SY7-230A-3-T | | | | | |
| 1500 Nm | • | • | • | | 230 V | 55 s | 2 | | SY8-230A-3-T | | | | | |
| 2000 Nm | • | • | • | | 230 V | 70 s | 2 | | SY9-230A-3-T | | | | | |
| 2500 Nm | • | • | • | | 230 V | 70 s | 2 | | SY10-230A-3-T | | | | | |
| 3500 Nm | • | • | • | | 230 V | 70 s | 2 | | SY12-230A-3-T | | | | | |
| **Actuators with emergency control function NC/NO** | | | | | | | | | Actuator type NC | NO | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] |
| 20 Nm | • | | | ⟲ | 24 V | 75 s | | | SRF24A-5 | ..-O | 1200 | 1200 | 1200 | 1200 |
| | | | | ⟲ | | | 2 | | SRF24A-S2-5 | | 1200 | 1200 | 1200 | 1200 |
| | | | | ⟲ | AC 24 – 240 V DC 24 – 125 V | 75 s | | | SRFA-5 | ..-O | 1200 | 1200 | 1200 | 1200 |
| | | | | ⟲ | | | 2 | | SRFA-S2-5 | | 1200 | 1200 | 1200 | 1200 |
| 40 Nm | • | | | ⊣⊢ | 24 V | 150 s | | | GRK24A-5 | | 1200 | 1200 | 1200 | 1200 |
| <90 Nm | • | | | ⊣⊢ | 24 V | 150 s | | | DRK24A-5 | | | | | |
| | | | | ⊣⊢ | | | | | DRK24A-7 | | | | | |

| Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | | | | | | | | | | |
| 1200 | | | | | | | | | | |
| 1200 | 1200 | | | | | | | | | |
| 1200 | 1200 | | | | | | | | | |
| | 1200 | 1200 | | | | | | | | |
| | | | 1200 | | | | | | | |
| | | | 1200 | 1200 | | | | | | |
| | | | 1200 | 1200 | | | | | | |
| | | | | 1200 | 1200 | | | | | |
| | | | | 1200 | 1200 | | | | | |
| | | | | | | 1200 | 1200 | | | |
| | | | | | | 1200 | 1200 | | | |
| | | | | | | | | 600 | 600 [2] | |
| | | | | | | | | 1200 [5] | 1000 [3] | 600 [4] |
| | | | | | | | | | | 1000 [4] |

| Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] | Δps [kPa] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | 1200 | | | | | | | | | |
| 1200 | 1200 | | | | | | | | | |
| 1200 | 1200 | | | | | | | | | |
| 1200 | 1200 | | | | | | | | | |
| 1200 | 1200 | | | | | | | | | |
| | 1200 | 1200 | | | | | | | | |
| | | | 1200 | | | | | | | |
| | | | 1200 [1] | 1200 | | | | | | |
| | | | 1200 [1] | 1200 | | | | | | |
| | | | | | 1200 | 1200 | | | | |
| | | | | | 1200 | 1200 | | | | |
| | | | | | | | 1200 | 1200 | | |
| | | | | | | | 1200 | 1200 | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Continued next page

Continued from previous page

⟲ = Actuators with mechanical emergency control function.
⊣⊢ = Actuators with electrical emergency control function. The emergency setting position NC/NO of all ⊣⊢ actuators can be adjusted on the actuator.
**Value** = recommended combinations Value = other possible combinations (Data does not relieve the user of the obligation for testing in individual cases.)

[1] Adapter ZSY-005
[2] Adapter ZSY-401
[3] Adapter ZSY-701
[4] Adapter ZSY-702
[5] Adapter ZSY-703



Butterfly valves
**Flange / PN 6, 10, 16**

BELIMO

# Technical data sheet D6..N

**Butterfly valve with Wafer types**
- **For open and closed cold and warm water systems**
- **For switching heat generators or cooling machines on and off**

## Type overview

| Type | DN [ ] | PN [ ] | kvmax [ m³/h] |
|---|---|---|---|
| **D625N** | 25 | 6 / 10 / 16 | 45 |
| **D632N** | 32 | 6 / 10 / 16 | 55 |
| **D640N** | 40 | 6 / 10 / 16 | 70 |
| **D650N** | 50 | 6 / 10 / 16 | 90 |
| **D665N** | 65 | 6 / 10 / 16 | 180 |
| **D680N** | 80 | 6 / 10 / 16 | 300 |
| **D6100N** | 100 | 6 / 10 / 16 | 580 |
| **D6125N** | 125 | 6 / 10 / 16 | 820 |
| **D6150N** | 150 | 6 / 10 / 16 | 1600 |
| **D6200N** | 200 | 6 / 10 / 16 | 2900 |
| **D6250N** | 250 | 10 / 16 | 4400 |
| **D6300N** | 300 | 10 / 16 | 7300 |
| **D6350N** | 350 | 10 / 16 | 10900 |
| **D6400N** | 400 | 16 | 14200 |
| **D6450N** | 450 | 16 | 18800 |
| **D6500N** | 500 | 16 | 24100 |
| **D6600N** | 600 | 16 | 37300 |
| **D6700N** | 700 | 16 | 42800 |

## Technical data

| | | |
|---|---|---|
| **Functional data** | Media | Cold and warm water, water with glycol up to max. 50% vol. |
| | Medium temperature | -20...120°C |
| | Permissible pressure ps | 1600 kPa |
| | Leakage rate | Leakage rate A, tight (EN 12266-1) |
| | Pipe connectors | DN 25...200: Flange PN 6/PN 10/PN16 (according to ISO 7005-2)<br>DN 250...350: Flange PN 10 / PN 16 (according to ISO 7005-2)<br>DN 400...700: Flange PN 16 (according to ISO 7005-2) |
| | Angle of rotation | 90° |
| | Installation position | Upright to horizontal (in relation to the stem) |
| | Suitable connection flange | In accordance with ISO 7005-2 and EN 1092-2 |
| | Maintenance | Maintenance-free |
| **Materials** | Housing | EN-JS1030 (GGG 40), epoxy-powder coating (RAL 5002) |
| | Closing element | 1.4301 (stainless steel) |
| | Stem | 1.4005 (stainless steel) |
| | Stem seal | O-ring EPDM |
| | Spindle bearing | RPTFE |
| | Seat | EPDM |

## Safety notes

- The valve has been designed for use in stationary heating, ventilation and air-conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The valve does not contain any parts that can be replaced or repaired by the user.
- The valve may not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- When determining the flow rate characteristic of controlled devices, the recognised directives must be observed.
- The damper must be opened and closed slowly in order to avoid hydraulic shocks in the pipe system.

## Product features

**Principle of operation**

The butterfly valve is opened or closed completely by an open-close rotary actuator. Continuous rotary actuators are connected by a commercially available controller and move the valve to any position desired. The valve disk made of stainless steel is pressed into the soft-sealing EPDM seat by a rotary movement and ensures leakage rate A (tight). The pressure losses are slight in the open position and the kv value is at a maximum.

**Manual override**

Manual throttling or shut-off can be carried out with a lever or a worm gear (see «Accessories»).
-With lever (DN25…150): Adjustable in 10 ratchet steps with position indication ( 0 = 0° (angle); 9 = 90° (angle) )
-With worm gear (DN25...700): steplessly adjustable (self-locking) with position indication.

## Accessories

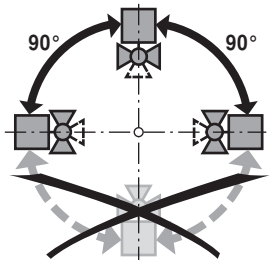
| | Description | Type |
|---|---|---|
| **Electrical accessories** | Stem heating flange ISO 5211, F05 (30W) | ZR24-F05 |

| | Description | Type |
|---|---|---|
| **Mechanical accessories** | Worm gear for D6.. butterfly valves, DN25...DN100 | ZD6N-S100 |
| | Manual control for D6.. butterfly valves, for DN25...DN100 | ZD6N-H100 |
| | Worm gear for D6.. butterfly valves, DN125...DN150 | ZD6N-S150 |
| | Manual control for D6.. butterfly valves, for DN125...DN150 | ZD6N-H150 |
| | Worm gear for D6.. butterfly valves, DN200 | ZD6N-S200 |
| | Worm gear for D6.. butterfly valves, DN250 | ZD6N-S250 |
| | Worm gear for D6.. butterfly valves, DN300...DN350 | ZD6N-S350 |
| | Worm gear for D6.. butterfly valves, DN400 | ZD6N-S400 |
| | Worm gear for D6.. butterfly valves, DN450 | ZD6N-S450 |
| | Worm gear for D6.. butterfly valves, DN500 | ZD6N-S500 |
| | Worm gear for D6.. butterfly valves, DN600 | ZD6N-S600 |
| | Worm gear for D6... butterfly valves, DN700 | ZD6N-S700 |

## Installation notes

**Recommended installation positions**

The butterfly valves may be mounted upright to horizontal. The butterfly valves may not be installed in a hanging position i.e. with the spindle pointing downwards.




**Water quality requirements**

The water quality requirements specified in VDI 2035 must be adhered to.

**Stem heating**

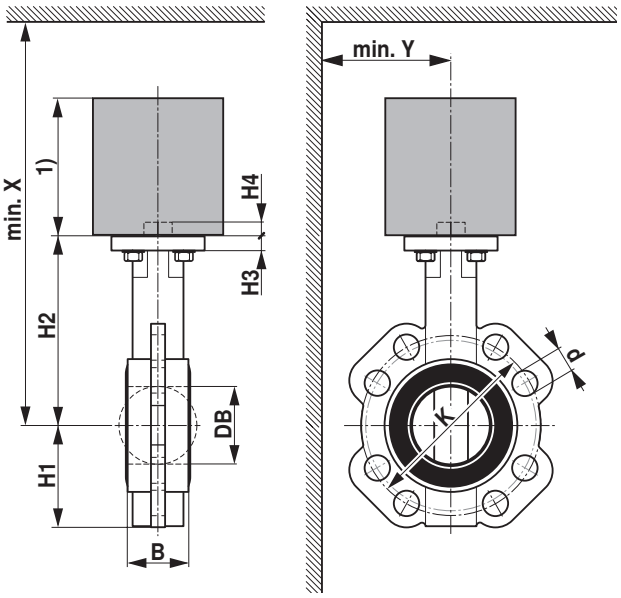
In cold water applications and warm humid ambient air can cause condensation in the actuators. This can lead to corrosion in the gear box of the actuator and causes a breakdown of it. In such applications, the use of a stem heating is provided.
The stem heating must be enabled only when the system is in operation, because it does not have temperature control.

**Maintenance**

Butterfly valves and rotary actuators are maintenance-free.
Before any kind of service work is carried out on the actuator, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow everything to cool down first if necessary and reduce the system pressure to ambient pressure level).
The system must not be returned to service until the butterfly valve and the rotary actuator have been mounted properly in accordance with the instructions and the pipeline has been refilled in the proper manner.
To avoid a torque increase during off season shut down, exercise the butterfly valve (full open and close) at least once a month.

## Dimensions / Weight

### Dimensional drawings




| Type | DN [ ] | B [ mm] | DB [ mm] | H1 [ mm] | H2 [ mm] | H3 [ mm] | H4 [ mm] | d (PN6) | K (PN6) [ mm] |
|---|---|---|---|---|---|---|---|---|---|
| **D625N** | 25 | 32 | 30 | 57 | 86 | 10 | 13 | 4 x 11 | 75 |
| **D632N** | 32 | 33 | 35 | 60 | 100 | 10 | 13 | 4 x 14 | 90 |
| **D640N** | 40 | 33 | 42 | 68 | 119 | 10 | 13 | 4 x 14 | 100 |
| **D650N** | 50 | 43 | 52 | 72 | 133 | 11 | 13 | 4 x 14 | 110 |
| **D665N** | 65 | 46 | 64 | 81 | 147 | 11 | 13 | 4 x 14 | 130 |
| **D680N** | 80 | 46 | 78 | 96 | 158 | 11 | 13 | 4 x 19 | 150 |
| **D6100N** | 100 | 52 | 103 | 106 | 170 | 11 | 13 | 4 x 19 | 170 |
| **D6125N** | 125 | 56 | 122 | 122 | 194 | 15 | 19 | 8 x 19 | 200 |
| **D6150N** | 150 | 56 | 155 | 140 | 202 | 15 | 19 | 8 x 19 | 225 |
| **D6200N** | 200 | 60 | 202 | 172 | 240 | 15 | 19 | 8 x 19 | 280 |
| **D6250N** | 250 | 68 | 250 | 206 | 268 | 15 | 24 | | |
| **D6300N** | 300 | 78 | 301 | 244 | 316 | 15 | 24 | | |
| **D6350N** | 350 | 78 | 333 | 267 | 361 | 15 | 24 | | |
| **D6400N** | 400 | 102 | 391 | 308 | 400 | 20 | 48 | | |
| **D6450N** | 450 | 114 | 442 | 337 | 422 | 22 | 48 | | |
| **D6500N** | 500 | 127 | 493 | 359 | 480 | 22 | 48 | | |
| **D6600N** | 600 | 154 | 594 | 454 | 562 | 25 | 48 | | |
| **D6700N** | 700 | 165 | 695 | 505 | 624 | 33 | 66 | | |

| Type | d (PN10) | K (PN10) [ mm] | d (PN16) | K (PN16) [ mm] | X [ mm] | Y [ mm] | Weight approx. [ kg] |
|---|---|---|---|---|---|---|---|
| **D625N** | 4 x 14 | 85 | 4 x 14 | 85 | 320 | 150 | 1.1 |
| **D632N** | 4 x 19 | 100 | 4 x 19 | 100 | 340 | 150 | 1.5 |
| **D640N** | 4 x 19 | 110 | 4 x 19 | 110 | 350 | 160 | 1.6 |
| **D650N** | 4 x 19 | 125 | 4 x 19 | 125 | 370 | 160 | 2.4 |
| **D665N** | 4 x 19 | 145 | 4 x 19 | 145 | 380 | 170 | 3.0 |
| **D680N** | 8 x 19 | 160 | 8 x 19 | 160 | 390 | 180 | 3.3 |
| **D6100N** | 8 x 19 | 180 | 8 x 19 | 180 | 410 | 190 | 4.0 |
| **D6125N** | 8 x 19 | 210 | 8 x 19 | 210 | 530 | 210 | 6.7 |
| **D6150N** | 8 x 23 | 240 | 8 x 23 | 240 | 540 | 220 | 7.4 |
| **D6200N** | 8 x 23 | 295 | 12 x 23 | 295 | 580 | 250 | 12 |
| **D6250N** | 12 x 23 | 350 | 12 x 28 | 355 | 630 | 280 | 20 |
| **D6300N** | 12 x 23 | 400 | 12 x 28 | 410 | 680 | 310 | 30 |
| **D6350N** | 16 x 23 | 460 | 16 x 28 | 470 | 730 | 340 | 34 |
| **D6400N** | | | 4 x 31 | 525 | 1300 | 1300 | 60 |
| **D6450N** | | | 4 x 31 | 585 | 1300 | 1400 | 73 |
| **D6500N** | | | 4 x 33 | 650 | 1700 | 1500 | 98 |
| **D6600N** | | | 16 x 37 | 770 | 1800 | 1800 | 190 |
| **D6700N** | | | 20 x 37 | 840 | 1800 | 1900 | 330 |

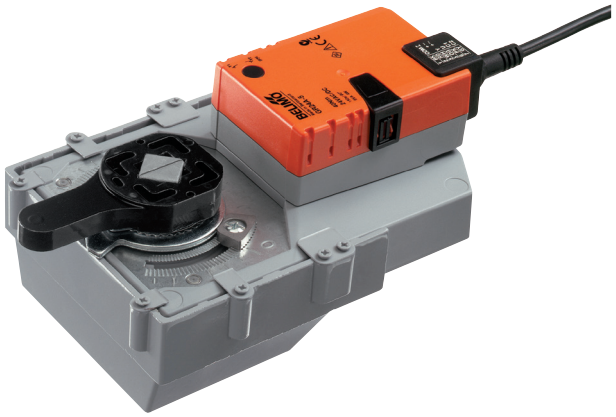
## Further documentation

- Overview Valve-actuator combinations
- Data sheets for actuators
- Installation instructions for actuators and/or butterfly valves
- General notes for project planning

BELIMO

# Technical data sheet GR24A-5

**Rotary actuator for rotary valves and butterfly valves**
- **Nominal torque 40 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control Open-close**



## Technical data

| | | |
|---|---|---|
| **Electrical data** | Nominal voltage | AC/DC 24 V |
| | Nominal voltage frequency | 50/60 Hz |
| | Nominal voltage range | AC 19.2...28.8 V / DC 19.2...28.8 V |
| | Power consumption in operation | 4 W |
| | Power consumption in rest position | 2 W |
| | Power consumption for wire sizing | 6 VA |
| | Connection supply / control | Cable 1 m, 3 x 0.75 mm² |
| | Parallel operation | Yes (note the performance data) |
| **Functional data** | Torque motor | Min. 40 Nm |
| | Manual override | Gear disengagement with push-button, can be locked |
| | Running time motor | 150 s / 90° |
| | Sound power level motor max. | 45 dB(A) |
| | Position indication | Mechanically (integrated) |
| **Safety** | Protection class IEC/EN | III Safety extra-low voltage |
| | Protection class UL | UL Class 2 Supply |
| | Degree of protection IEC/EN | IP54 |
| | Degree of protection NEMA/UL | NEMA 2, UL Enclosure Type 2 |
| | EMC | CE according to 2004/108/EC |
| | Certification IEC/EN | IEC/EN 60730-1 and IEC/EN 60730-2-14 |
| | Certification UL | cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1:02 |
| | Mode of operation | Type 1 |
| | Rated impulse voltage supply / control | 0.8 kV |
| | Control pollution degree | 3 |
| | Ambient temperature | -30...50°C |
| | Non-operating temperature | -40...80°C |
| | Ambient humidity | 95% r.h., non-condensing |
| | Maintenance | Maintenance-free |
| **Mechanical data** | Connection flange | F05 |
| **Weight** | Weight approx. | 1.85 kg |

## Safety notes

- This device has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The switch for changing the direction of rotation may only be operated by authorised specialists. The direction of rotation must not in particular be reversed in a frost protection circuit.
- The device may only be opened at the manufacturer‘s site. It does not contain any parts that can be replaced or repaired by the user.
- The cables must not be removed from the device.

## Safety notes

- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

## Product features

**Direct mounting** Simple direct mounting on the rotary valve or butterfly valve with mounting flange. The mounting orientation in relation to the fitting can be selected in 90° steps.

**Manual override** Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).

**High functional reliability** The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.

**Adjustable angle of rotation** Adjustable angle of rotation with mechanical end stops.

**Combination valve/actuator** For valves with the following mechanical specifications in accordance with ISO 5211 F05:
- Square stem head SW = 14 mm for form fit coupling of the rotary actuator.
- Hole circle d = 50 mm

## Accessories

**Electrical accessories**

| Description | Type |
|---|---|
| Auxiliary switch, add-on, 1 x SPDT | S1A |
| Auxiliary switch, add-on, 2 x SPDT | S2A |
| Feedback potentiometer 140 Ohm, add-on | P140A |
| Feedback potentiometer 200 Ohm, add-on | P200A |
| Feedback potentiometer 500 Ohm, add-on | P500A |
| Feedback potentiometer 1 kOhm, add-on | P1000A |
| Feedback potentiometer 2.8 kOhm, add-on | P2800A |
| Feedback potentiometer 5 kOhm, add-on | P5000A |
| Feedback potentiometer 10 kOhm, add-on | P10000A |

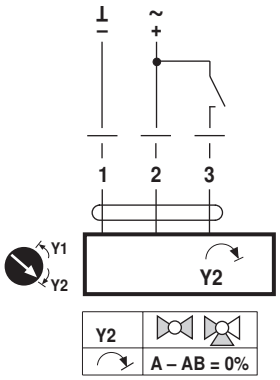
## Electrical installation

**Notes**

- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.
- 3-point control only allowed with ball valves, not allowed with butterfly valves.

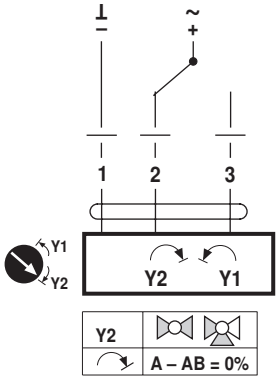
### Wiring diagrams

**AC/DC 24 V, open-close**




Cable colours:
1 = black
2 = red
3 = white

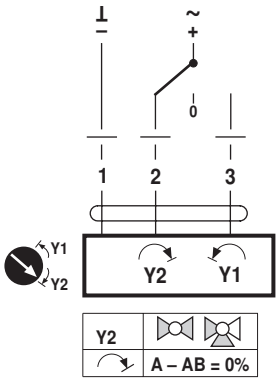
**AC/DC 24 V, open-close**




Cable colours:
1 = black
2 = red
3 = white

## Electrical installation

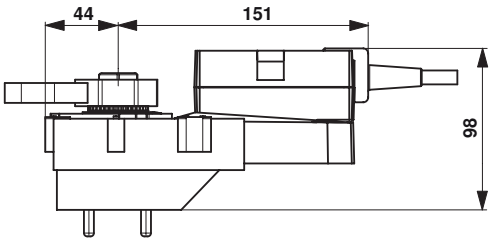
**AC/DC 24 V, 3-point**

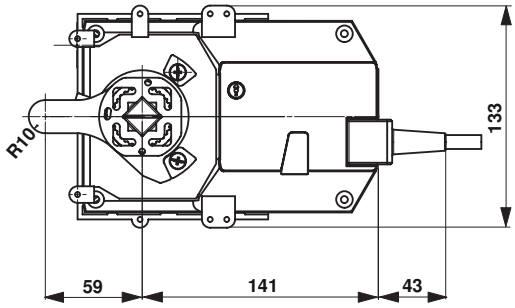



Caution:
only with ball valves, not allowed
with butterfly valves

## Dimensions [mm]

**Dimensional drawings**




## Further documentation

- Overview Valve-actuator combinations
- Data sheets for rotary valves and butterfly valves
- Installation instructions for actuators and/or rotary valves and butterfly valves
- General notes for project planning

# LEVEL REGULATORS

# LEVEL REGULATORS

## Electro-mechanical level regulators

The **SMART** level regulator is a float switch for managing liquid levels to permit the introduction of electrical equipment (usually pumps but also electrovalves, alarms, motorised shutters, etc.) to reach pre-set levels. Made in non-toxic polypropylene, it can also be used in contact with liquid foodstuffs.

RLG 01/3PVC

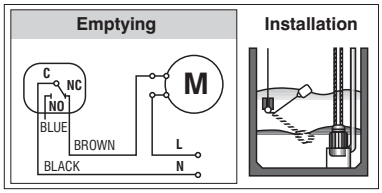
| Code | Description | Pack. Pc. |
|---|---|---|
| **1CL RLG 01/3PVC** | **Float switch level regulator for clear water - 3 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~ ; operating temperature: 0 ÷ 50° C;<br>pressure resistance 1.5 BAR; IP 68 | **10** |
| **1CL RLG 02/5PVC** | **Float switch level regulator for clear water - 5 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~ ; operating temperature: 0 ÷ 50° C;<br>pressure resistance 1.5 BAR; IP 68 | **10** |
| **1CL RLG 03/10PVC** | **Float switch level regulator for clear water - 10 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~ ; operating temperature: 0 ÷ 50° C;<br>pressure resistance 1.5 BAR; IP 68 | **10** |
| **1CL RLG 04/15PVC** | **Float switch level regulator for clear water - 15 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~ ; operating temperature: 0 ÷ 50° C;<br>pressure resistance 1.5 BAR; IP 68 | **10** |
| **1CL RLG 05/20PVC** | **Float switch level regulator for clear water - 20 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~ ; operating temperature: 0 ÷ 50° C;<br>pressure resistance 1.5 BAR; IP 68 | **10** |
| **1CL RLG 06/25PVC** | **Float switch level regulator for clear water - 25 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~; operating temperature: 0 ÷ 50° C;<br>pressure resistance 1.5 BAR; IP 68 | **10** |

The **MAC5** is an immersed tilting level regulator. Its most essential feature is its heavy body which is bulky and free of irregularities which make it ideal for use in sewage waters, in industrial waste waters with suspended agglomerate residues and in turbulent waters. The regulator is made up of an internal casing where a float switch is positioned and counterbalanced so that when the level is increased, the position of the regulator itself is inverted. During a phase of descent, the level tilts oppositely. Its body in high-pressure fused polypropylene guarantees perfect sealing against any infiltration.

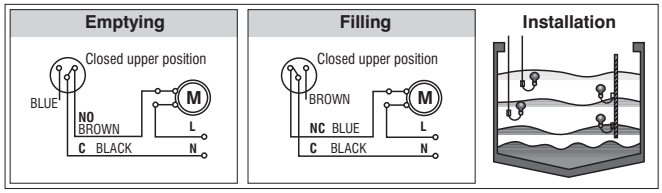
RLG 10/5PVC

| | | |
|---|---|---|
| **1CL RLG 10/5PVC** | **Float switch level regulator for sewage water - 5 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~; operating temperature: 0 ÷ 50° C;<br>pressure resistance 2 BAR; IP 68 | **10** |
| **1CL RLG 11/10PVC** | **Float switch level regulator for sewage water - 10 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~; operating temperature: 0 ÷ 50° C;<br>pressure resistance 2 BAR; IP 68 | **10** |
| **1CL RLG 12/20PVC** | **Float switch level regulator for sewage water - 20 m 3x1 PVC cable**<br>electrical range: 10(8) A / 250V~; operating temperature: 0 ÷ 50° C;<br>pressure resistance 2 BAR: IP 68 | **10** |
| **1CL RLG 20/5NEOP** | **Float switch level regulator for sewage water - 5 m 3x1 NEOPRENE cable**<br>electrical range: 10(8) A / 250V~; operating temperature: 0 ÷ 50° C;<br>pressure resistance 2 BAR; IP 68 | **10** |
| **1CL RLG 21/10NEOP** | **Float switch level regulator for sewage water - 10 m 3x1 NEOPRENE cable**<br>electrical range: 10(8) A / 250V~; operating temperature: 0 ÷ 50° C;<br>pressure resistance 2 BAR; IP 68 | **10** |
| **1CL RLG 22/20NEOP** | **Float switch level regulator for sewage water - 20 m 3x1 NEOPRENE cable**<br>electrical range: 10(8) A / 250V~; operating temperature: 0 ÷ 50° C;<br>pressure resistance 2 BAR; IP 68 | **10** |

**SMART** level regulator




**MAC5** Level regulator



# LEVEL REGULATORS

## Electronic level regulators

Regulators for conductive liquids, fitted to verify minimum and maximum levels of deep wells, tanks, cisterns, etc.
The operating principle is based on control box detection of liquid resistance, of which the level is controlled by means of preset probes immersed in the liquid, with the longest probe functioning as a common element.
When the level of the liquid inside the container or the well wets all three immersed Probes (Common (C), Low (L), High (H)) relay activation takes place, which is then deactivated on when the level goes back down and the lowest probe is uncovered.

RLE230/2

RLEME/3

| Code | Description | Pack Pc. |
|---|---|---|
| **1CL RLE024/2** | **Electronic level regulator - 2 DIN**<br>adjustable sensitivity level; power supply: 24V~ 50-60 Hz; relay output: 5A /250V~ ; class: II; IP 20 | **10** |
| **1CL RLE230/2** | **Electronic level regulator - power supply 230V~ - 2 DIN**<br>adjustable sensitivity level; power supply: 230V~ 50-60 Hz; relay output: 5A /250V~; class: II; IP 20 | **10** |
| **Serie E (Advanced)** | - relay intervention delay setting from 0 ÷ 16"<br>- relay intervention mode selection FILLING/ EMPTYING<br>- version 3 DIN with 2 output switches | |
| **1CL RLEME/3** | **Advanced multivoltage electronic level regulator - 3 DIN**<br>sensitivity, intervention delay, adjustable intervention mode; Multivoltage power supp. 24-117-230V~;<br>1st relay output: 5A /250V~: 2nd relay output: 2A /250V~; class: II; IP 20 | **10** |
| **1CL RLE230E/2** | **Advanced 230V electronic level regulator - 2 DIN**<br>sensitivity, intervention delay, adjustable intervention mode; power supply: 230V~ 50-60 Hz;<br>relay output: 5A /250V~; class: II; IP 20 | **10** |

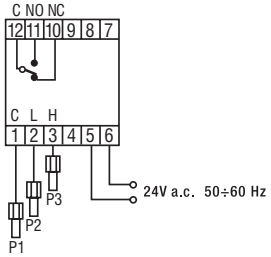
## Accessories:

SF010

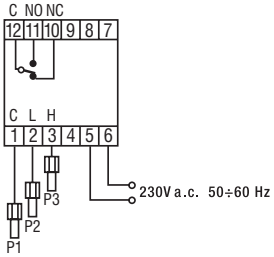
ST021

| | | |
|---|---|---|
| **1CL SF010** | **Probe with electric wire connection**<br>assembly: directly in liquid; dimensions: Ø mm 22x85;<br>maximum operating temperature: 80°C | **10** |
| **1CL ST021** | **3-conductor probe holder**<br>assembly: hole Ø mm 65; dimensions: Ø mm 80x72;<br>maximum operating temperature: 80°C | **10** |

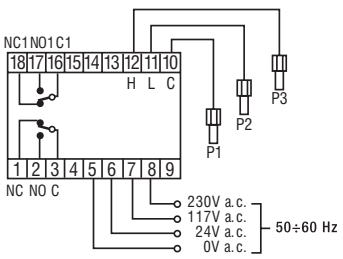
**1CLRLE024/2**



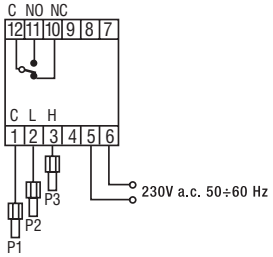

**1CLRLE230/2**

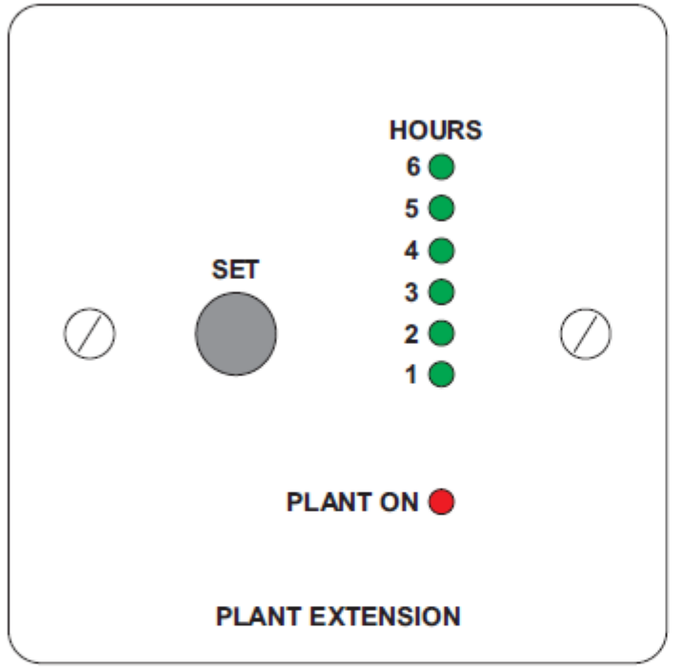



**1CLRLEME/3**




**1CLRLE230E/2**





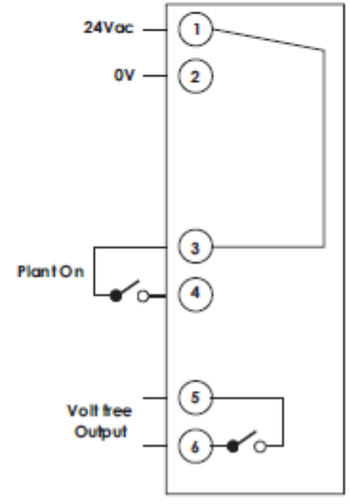

Single gang switchplate

Press button to select extension time required
LEDs indicate time selected (each press advances the time selected Off, 1 ,2, 3, 4, 5, 6, Off)

As the selected period times out the LEDs pulse slowly and go out to indicate the remaining time
If the pushbutton is pressed whilst the Extension time is in progress it advances the time remaining
Time period selectable by jumpers
(3 hours in ½ hour steps, 6 hours in 1 hour steps, 12 hours in 2 hour steps)

6 outgoing terminals

Supply 24Vac
Volt free contacts N/O
Volt free contact (Plant On)



# UC32.netK

| | | |
|---|---|---|
| UC32.netK | UC32.netK/WEB | UC32.netK/WEB/MOD |
| | UC32.netK/LC/WEB | UC32.netK/LC/WEB/MOD |
| | UC32.netK/ELC/WEB | UC32.netK/ELC/WEB/MOD |
| UC32.netK/P | | UC32.netK/WEB/MODex |


The **UC32.netK** is an Ethernet-based peer-to-peer Communications Controller, used to network UnitronUC32 Field Controllers together. The **UC32.netK** co-ordinates communication between I/O controllers on its fieldbus, with other **UC32.netKs** and with PCs using Ethernet, and other peripherals using RS232/RS485 serial protocols.

It can also add additional communications protocols such as BACnet and Modbus to the UnitronUC32 system, along with fieldbus-supervision web pages and email alarm facility.

- **Peer-to-peer Networking**

  100Mbps Fast Ethernet using TCP/IP

- **Optional BACnet/IP support**

  read point values, read/write setpoints

- **Embedded Web Server**

  Controller configuration can be monitored and adjusted using standard web browser

  Fieldbus supervisor web pages and alarm emailing system available on /WEB model options

- **Optional Modbus Support**

  Serial RTU support, Master and Slave.

- **RS485 and RS232**

  for connection to modems, serial printers, keypads or supervisory computers

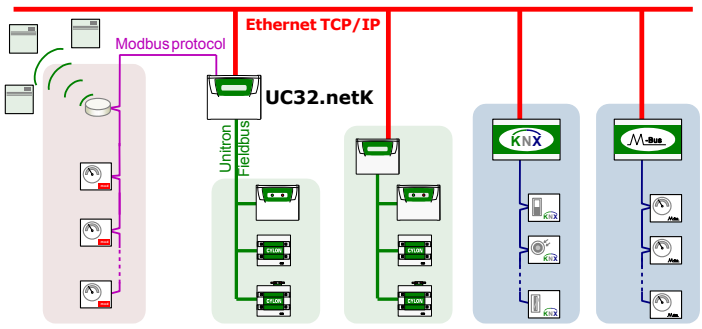
- **Fieldbus**

  for adding Unitron DDC* controllers within a radius of 1200 M without repeaters

  *Direct Digital Control

- **Powerful Diagnostics**

  with rapid error-free commissioning technologies




The **UC32.netK communications** controller is part of the **UnitronUC32** range of products, which offers the following benefits:

## Unique Flexibility with UniPuts™

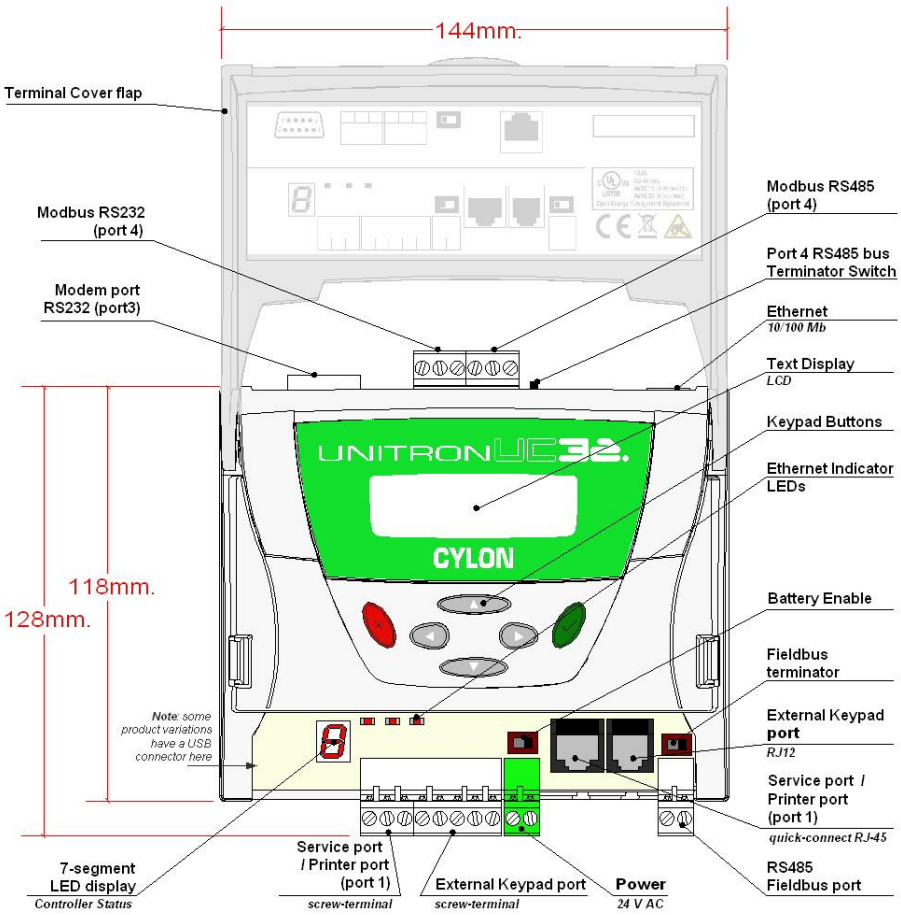
The **UnitronUC32** range uniquely presents **UniPuts™** - a revolutionary answer to flexible point configuration, offering maximised utilisation of controller capacity along with flexibility in strategy changes. Built on a modern web-based architecture, the **UnitronUC32** range has a wide application scope with the flexibility of being stand-alone or network enabled. Easily customisable, the UnitronUC32 range has optional internal or external keypads for a powerful yet user-friendly interface, matched by extensive monitoring and logging capabilities.

## The right integration at the right level

The **UnitronUC32** solution provides a wide choice of integration options including BACnet, Modbus, M-Bus, KNX, and OPC. Cylon's philosophy is to provide an open system that is truly future proof. With Modbus, M-Bus and KNX, Cylon offers high performance Fieldbus integration. BACnet is the international standard that provides peer to peer integration over TCP/IP. OPC Server extends UnitronUC32 integration beyond building services.

Cylon CONTROLS

DATASHEET




**Note:**

In the keypad version of this controller,

1) pressing the and buttons simultaneously causes the display to toggle between **Configuration** and **Program** modes.

2) pressing the and buttons simultaneously changes the contrast of the LCD screen display .

**Port 4 RS485 Terminator**

OFF
(RS485 bus not terminated at this controller)

ON
(RS485 bus terminated at this controller)

**Ethernet Indicator LEDs**

| | Traffic | Collision | Link |
|---|---|---|---|
| LED on | Ethernet message received | Collision detected | Ethernet is connected |
| LED off | No incoming Ethernet messages | No Collision detected | Ethernet is not connected |

**Battery Enable Switch**

Battery Disabled

Battery Enabled

**Fieldbus Network Terminator**

OFF
(fieldbus not terminated at this controller)

ON
(fieldbus terminated at this controller)

## Factory Configuration Options:

**Note:** For models supporting greater than 32 Modbus devices, devices with a fractional (¼ or better) unit load will be required to reach the number of Modbus devices limit.

**Important:** The **Battery Enable Switch** (located above the Power 24 Vac connection) must be switched to the **"Battery Enabled" position** to ensure backup of controller settings such as Time Schedules and Globals when the UC32.netK is powered down. Press the "up" key on the UC32.netK keypad to check the battery status.

| | UC32.netK | UC32.netK/WEB | UC32.netK/WEB/MOD | UC32.netK/WEB/MODex | UC32.netK/LC/WEB | UC32.netK/LC/WEB/MOD | UC32.netK/ELC/WEB | UC32.netK/ELC/WEB/MOD | UC32.netK/P |
|---|---|---|---|---|---|---|---|---|---|
| Maximum number of field controllers | 63 | 63 | 63 | 63 | 4 | 4 | 1 | 1 | 63 |
| Internal Keypad | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Embedded WebLink | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Active Modbus port | ✗ | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ | ✓ | ✓ |
| Maximum number of Modbus devices | ✗ | ✗ | 48 | 122 | ✗ | 24 | ✗ | 12 | 32 |
| Wireless Sensor support | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| BACnet/IP support | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ |

# Specifications:

## MECHANICAL

| | |
|---|---|
| Size (excluding terminal plugs) | 144 x 118 x 65 mm (5.7 x 4.7 x 2.6") |
| Enclosure | Injection moulded ABS |
| Mounting | DIN rail |

## ENVIRONMENT

***Note**: This equipment is intended for field installation within another enclosure.*

| | |
|---|---|
| Ambient Temperature | 0° - 50°C (32°-122°F) ambient. |
| Ambient Humidity | 0% - 90% RH non-condensing |
| EMC Immunity | EN 50082-1 |
| EMC Emission | EN55011 Class B |
| Protection Class | IP20/DIN 40050 |

## WIRING

**Note**: *Use Copper or Copper Clad Aluminium conductors only.*

| | |
|---|---|
| Ethernet | Screened or Unscreened CAT5e |
| RS485 Fieldbus | 2 core screened twisted pair (e.g Belden 8132 up to 600m at max baud rate 76k, Belden 9841 up to 1200m at max baud rate 76k.) |
| RS232 (no handshaking) | 3 core screened |
| RS232 (with handshaking) | 9 core screened |
| External Keypad | 6-core telephone type cable |

## ELECTRICAL

| | |
|---|---|
| Supply Requirements | 24 V AC +/- 20% 50/60 Hz |
| Transformer Rating | with UCKRA420: 15 VA<br>without UCKRA420: 10 VA |
| Power Rating | 5 Watts maximum |
| Fuse Rating | 1 A resettable |

## PROCESSOR

| | |
|---|---|
| Type | Digi 32bit ARM |
| Memory | 16Mb RAM, 16Mb Flash (except UC32.netK/P : 8Mb Flash) |
| Real-Time Clock | Battery backed for 6 months minimum |

## INTERFACE

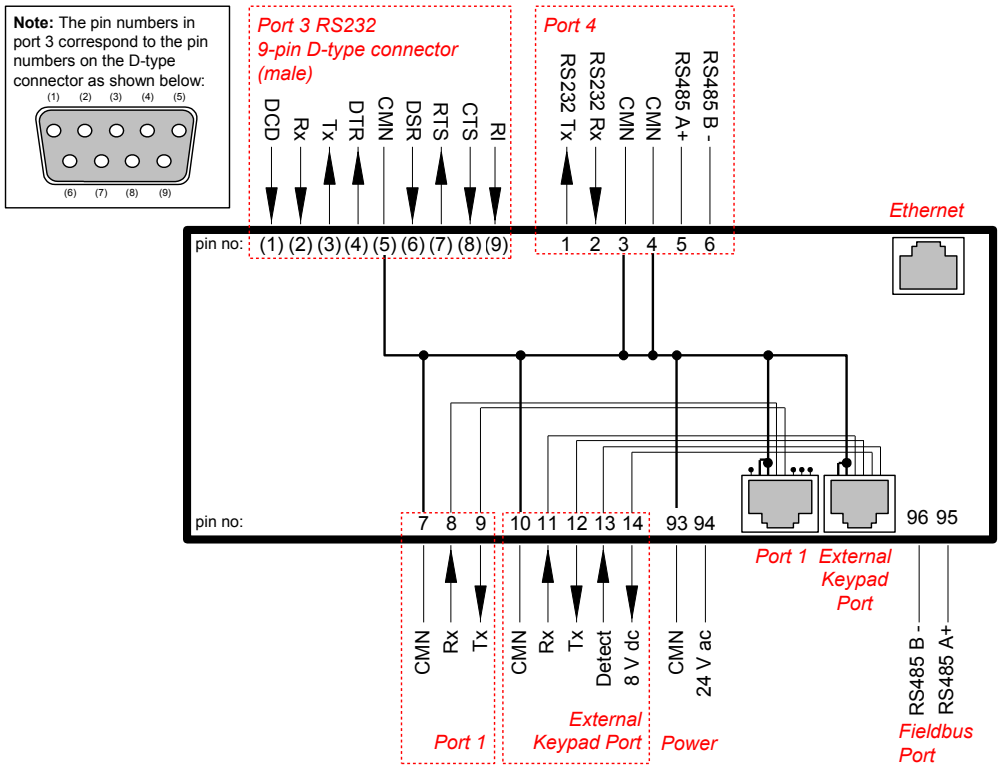
| | |
|---|---|
| Software | Unitron Command Centre<br>Unitron Engineering Centre<br>WebLink |
| Internal Keypad | LCD 4 x 20 characters, 6 Buttons. Compatible with UCKRA420 |
| External Keypad | UCKRA420 Serial Text Keypad connected via RJ12 port (Maximum cable length 50m) |

## SOFTWARE FEATURES

| | |
|---|---|
| Keypad Configuration Mode | Accessible via Internal or External Keypad. |
| Embedded Web Configuration Interface | UC32.netK configuration parameters can be accessed through embedded web pages, including:<br>▪ Fieldbus Setup and Map<br>▪ Unet status and setup<br>▪ Globals<br>▪ Alarm, Printer and Modem Strings<br>▪ Port configurations<br>▪ System statistics |
| Embedded WebLink *(except UC32.netK/P)* | Can serve dynamic web pages, created in Unitron engineering Centre, to view and change points, datalogs and alarms on the local Fieldbus. |
| Firmware Upgrade | Firmware can be upgraded via IP / LAN (except UC32.netK/P : via Port 1) |

## COMMUNICATION PORT SPECIFICATIONS

| Port | Connector | Transmission type | Detail | Function |
|---|---|---|---|---|
| Fieldbus Port | 2 way plug terminal | RS485 | @ 9K6, 19K2, 38K4 or 76K8 Baud | Fieldbus communications<br>Max no. of nodes: *(non-LC options)* — UC32.24: 16, UCU : 63<br>Max no. of nodes : *(LC option)* — 4<br>Max no. of nodes : *(ELC option)* — 1<br>Max distance between nodes: — 1200 m (3937')<br>Max length of network: — 1200 m (3937')<br>Terminating resistance — internal 120 Ω switchable |
| External Keypad Port | RJ12 / 5 way plug terminal | RS232 | 9K6 Baud | Keypad communications |
| Port 1 | RJ45 / 3 way plug terminal | RS232 | @ 1K2, 2K4, 9K6, 14K4, 19K2, 38K4, 57K6 or 115K2 Baud | Service Port<br>Printer |
| Port 3 | 9 way Male D type | RS232 | with full hardware handshaking | Modem with Unitron Software<br>Printer<br>Service port |
| Port 4 (/MOD model options only) | 6 way plug terminal | RS232 / RS485 | @ 300, 600, 1K2, 2K4, 4K8, 9K6, 14K4, 19K2, 38K4, 57K6 or 115K2 Baud | Modbus-Master<br>Modbus-Slave |
| Ethernet Port | RJ45 | Fast full-duplex Ethernet | 10/100 BaseT | Service Port — BACnet/IP *(/P only)*<br>Network Link — HTTP, SMTP *(except /P)*, FTP<br>Max no. of Unitron nodes : 254 |



# UC32.24 UC32.24K

The UC32.24 is a programmable controller, with 8 Universal Inputs, 8 UniPut™ channels, 8 UniPut™ + Relay channels, and an optional built-in keypad interface. Cylon's UnitronUC32.24 and UnitronUC32.24K are ideally suitable for main plant control, including AHUs, Boilers, Rooftop units, Lighting etc.


- 8 UniPuts™

  hardware connections that can be set as either inputs or outputs (software selectable)

- 8 UniPuts™ + Relays

  hardware connections that can be used as inputs, outputs, or relays (software selectable)

- 8 Universal Inputs

  hardware connections that can be used as analog or digital inputs (software selectable)

- Up to 16 controllers per fieldbus

- Flash upgradable firmware

- Time-stamped datalogs

  for increased flexibility and longer monitoring times

- 1024 strategy block

- 32 datalogs with up to 1024 entries per datalog

- Powerful Diagnostics

  with rapid error-free commissioning technologies

The **UC32.24** and **UC32.24K** controllers are part of the **UnitronUC32** range of products, which offers the following benefits:

## Unique Flexibility with UniPuts™

The **UnitronUC32** range uniquely presents **UniPuts™** - a revolutionary answer to flexible point configuration, offering maximised utilisation of controller capacity along with flexibility in strategy changes. Built on a modern web-based architecture, the **UnitronUC32** range has a wide application scope with the flexibility of being stand-alone or network enabled.

## Cost Effective, low entry point for building control

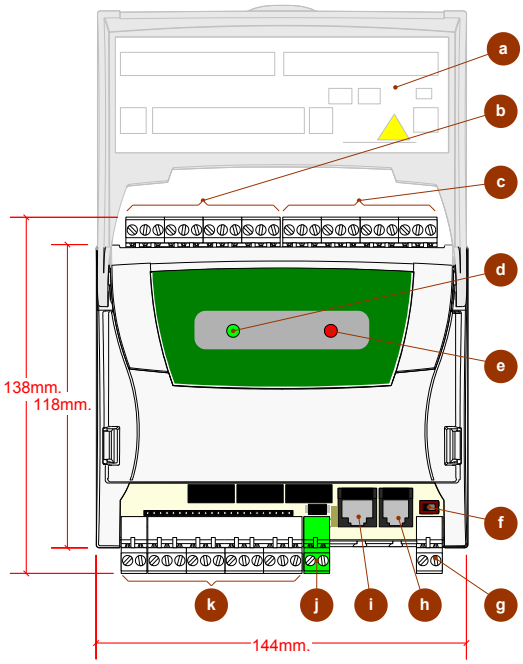
The **UnitronUC32** range offers reduced costs in terms of training, implementation, rollout and maintenance. Modular, extendible packages along with low installation costs mean a low entry point for building control. The future-proof **UnitronUC32** range provides forward & backward compatibility, meaning an effortless upgrade path for existing **Unitron** Systems.

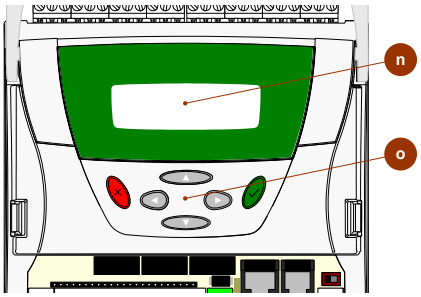
## Highly programmable and extendable through web-enabled HVAC technology

The **UnitronUC32** range offers an advanced web-based 32-bit architecture, with advanced programmability through **the Unitron Engineering Centre**. Inbuilt diagnostics, along with expanded data logging and strategy storage, is further enhanced by **Uniputs**™, offering up to 8 Universal inputs, up to 8 **Uniputs**™ (AI/DI/AO/DO) and up to 8 **Uniputs**™ with relays.

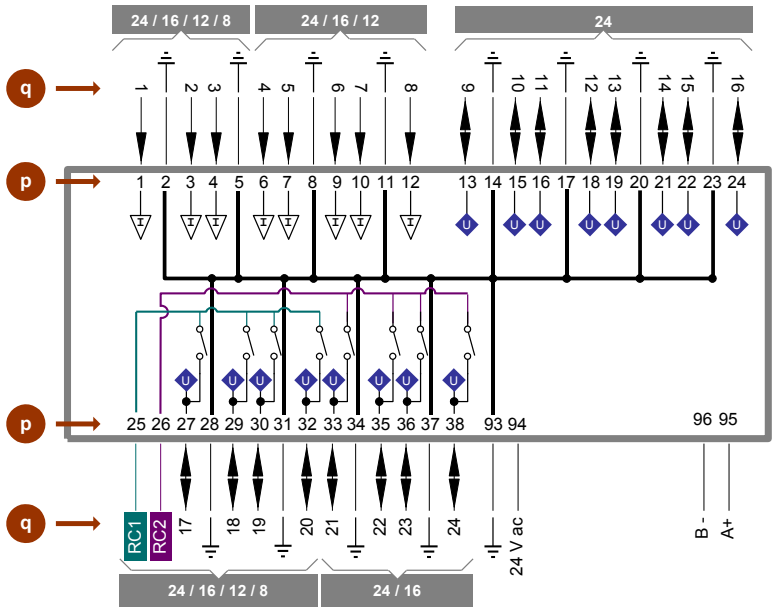
Cylon CONTROLS

DATASHEET




| | |
|---|---|
| a | Terminal Cover flap |
| b | Universal inputs |
| c | UniPuts™ |
| d | Status LED *(non-keypad variants only)* (green/orange)<br>• When GREEN, this LED indicates the CPU status.<br>• When ORANGE, this LED indicates that Manual Override is active. |
| e | Power LED *(non-keypad variants only)* |
| f | Fieldbus terminator<br>**OFF** (fieldbus not terminated at this controller)<br>**ON** (fieldbus terminated at this controller) |
| g | External Keypad port |
| h | Service Port |
| i | Power 24 $V_{ac}$ |
| j | UniPuts™ + relay |
| k | Text display (LCD) *(Keypad variants only)* |
| l | Internal Keypad *(Keypad variants only)*<br>• Pressing △ and ✓ together toggles the display between Configuration and Program modes.<br>• Pressing ▽ and ✓ together changes the contrast of the LCD screen display. |




| | |
|---|---|
| p | Terminal Numbers |
| q | Point Numbers |
| RC1 RC2 | Relay Common |
| ⏚ | Common |
| I | Universal Input |
| U | Uniput™ |
| U | Uniput™ + Relay |

**Note**: when these outputs are configured as relay they use either terminal 25 **RC1** or terminal 26 **RC2** as their common point. All other configurations use 28, 31, 34, or 37 ( ⏚ ) as their common point.

# Specifications:

## MECHANICAL

| | |
|---|---|
| Size (excluding terminal plugs) | 144 x 118 x 65 mm (5.7 x 4.7 x 2.6") |
| Enclosure | Injection moulded ABS |
| Mounting | DIN rail |

## ENVIRONMENT

***Note**: This equipment is intended for field installation within another enclosure.*

| | |
|---|---|
| Ambient Temperature | 0° - 50°C (32°-122°F) ambient. |
| Ambient Humidity | 0% - 90% RH non-condensing |
| EMC Immunity | EN 50082-1 |
| EMC Emission | EN55011 Class B |

## WIRING

***Note**: Use Copper or Copper Clad Aluminium conductors only.*

| | |
|---|---|
| Termination | PCB mounted plug terminal connections. |
| Conductor Area | Max: AWG 12 (3.09 $mm^2$)<br>Min: AWG 22 (0.355 $mm^2$) |

## ELECTRICAL

| | |
|---|---|
| Supply Requirements | 24 V AC +/- 20% 50/60 Hz |
| Transformer Rating | with UCKRA420: 25 VA<br>without UCKRA420: 20 VA |
| Power Rating | 10 Watts maximum |
| Fuse Rating | 1 A resettable |

## PROCESSOR

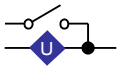
| | |
|---|---|
| Type | Hitachi (Renasas) SuperH SH17034 32-bit RISC |
| Clock Speed | 20 MHz |
| Operating System Memory | 512K flash |
| User Programmable Memory | 512K RAM Battery backed for 2 years minimum plus 256K flash |
| Real-Time Clock | Battery backed for 2 years minimum |

## INPUTS/OUTPUTS

***Note**: Screened cable is recommended for all input connections.*

| | |
|---|---|
| 8 Universal Inputs<br>(Points 1 - 8)<br>  | (Software selectable Interfaces)<br>Active Input 0 – 10 V @ 182 KΩ. 10 bit / 14 bit resolution.<br>Passive Input for a large range of temperature sensors, 10K3A1 sensors are recommended. 14 bit resolution.<br>Active Current Input 0 – 20 mA @ 390 Ohms. 10 bit / 14 bit resolution.<br>Digital Volt-Free contact @ 1 mA continuous.<br>Pulse Counting up to 20 Hz, minimum pulse width 25 mS.<br>Potentiometer input (0 KΩ -10 KΩ, 1 KΩ - 11 KΩ etc). |

*The following UniPut™ features are available with .s32 format strategies created with the Unitron Engineering Centre:*

| | |
|---|---|
| 8 UniPuts™<br>(Points 9 - 16)<br>  | (Software selectable interfaces)<br>Active Input 0 – 10 V @ 40 KΩ. 9 bit resolution.<br>Active Output 0 – 10 V @ 20 mA max load.<br>Digital Volt-Free contact @ 25 mA not continuous.<br>24 Vac Detect |
| 8 UniPuts™+Relays<br>(Points 17 - 24)<br>  | (Software selectable interfaces)<br>Active Input 0 – 10 V @ 40 KΩ. 9 bit resolution.<br>Active Output 0 – 10 V @ 20 mA max load.<br>Digital Volt-Free contact @ 25 mA not continuous.<br>24 Vac Detect<br>NO 24 Vac Relay contacts, 2 A continuous/ 15 A inrush |

## COMMUNICATIONS

| | |
|---|---|
| RS232 service port | @ 1K2, 2K4, 9K6, 19K2 or 38K4 Baud (defaults to 9K6) [cable: CC20/CAB] |
| Fieldbus RS485 port | @ 1K2, 2K4, 9K6, 19K2, 38K4 or 76K8 Baud (defaults to 38K4) |
| Keypad port | @ 9K6 Baud, RJ11 socket |
| Modem | Modem connection supported through RS232 service port [cable: CC31/CAB] |

## INTERFACE

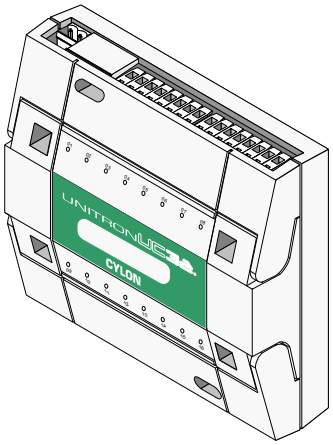
| | |
|---|---|
| Software | Unitron Command Centre<br>Unitron Engineering Centre<br>WebLink |
| Optional Internal Keypad (UC32.24K) | LCD 4 x 20 characters<br>6 Buttons. Compatible with UCKRA420 |
| Remote Keypad | UCKRA420 Serial Text Keypad<br>connected via RJ11 port<br>Maximum cable length 50m |

## SOFTWARE FEATURES

| | |
|---|---|
| Configuration Mode (Accessible via Internal or External Keypad/Display device.) | |
| Time Stamped Datalogs | |
| Firmware upgrading via Service port | |
| Maximum Number of Analog Points | 1024 |
| Maximum Number of Digital Points | 1024 |
| Maximum number of strategy blocks | 1024 |
| Maximum number of Datalog Modules | 32 (v 6.1.6 or later) |
| Maximum Controller Address | 16 |
| Maximum Datalog capacity | 1024 entries per Datalog (v 6.1.6 or later) |

# UC32.16DI

The **UC32.16DI** is a digital input multiplexer for use with UnitronUC32 Field Controllers. It has 16 Volt-free digital inputs and no outputs. The input values are sent to the strategies of UC32 controllers using Global messages.



- 16 Volt-free Digital inputs
- Isolated RS485 Fieldbus network with up to 1.2Km length

The **UC32.16DI** controller is part of the **UnitronUC32** range of products, which offers the following benefits:

## Unique Flexibility with UniPuts™

The **UnitronUC32** range uniquely presents **UniPuts™** - a revolutionary answer to flexible point configuration, offering maximised utilisation of controller capacity along with flexibility in strategy changes. Built on a modern web-based architecture, the **UnitronUC32** range has a wide application scope with the flexibility of being stand-alone or network enabled.

## Cost Effective, low entry point for building control

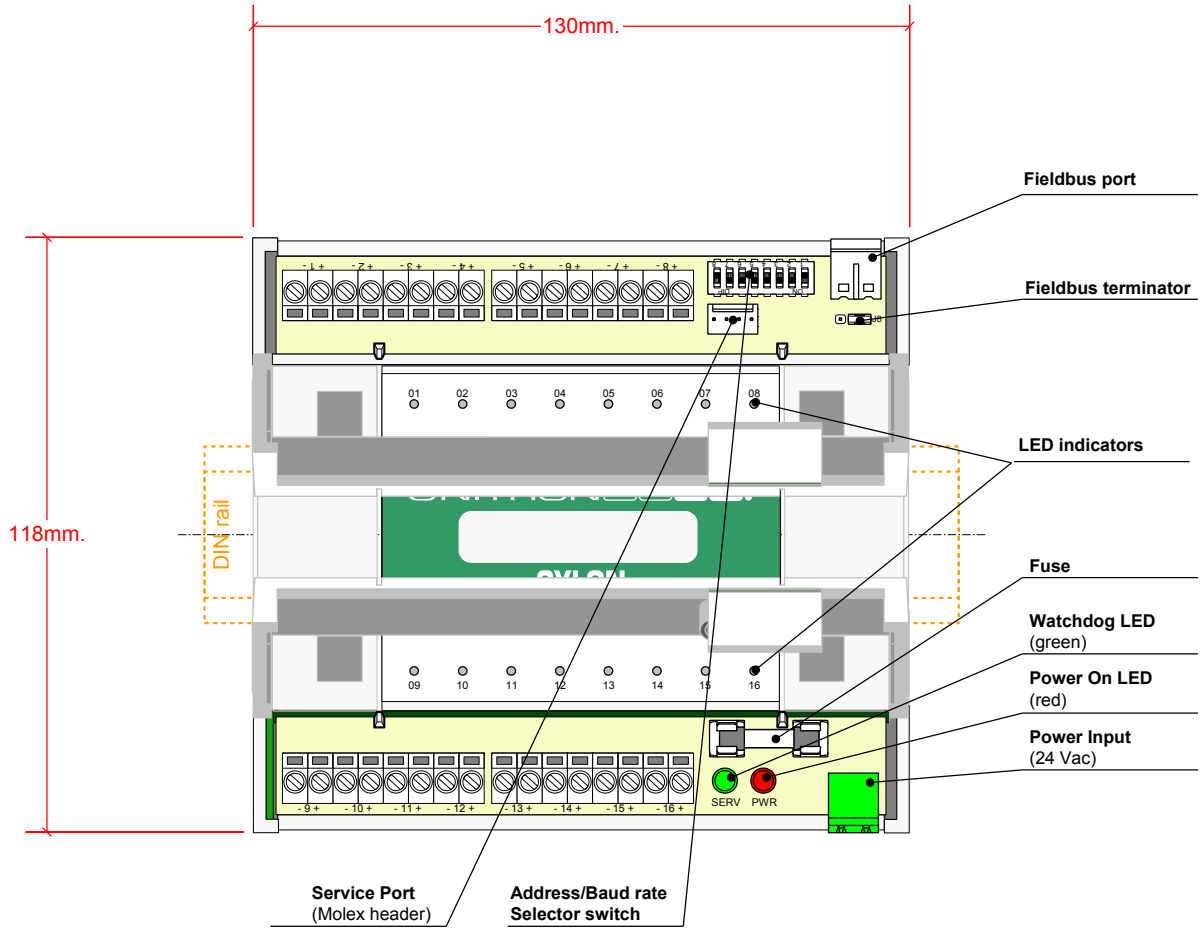
The **UnitronUC32** range offers reduced costs in terms of training, implementation, rollout and maintenance. Modular, extendible packages along with low installation costs mean a low entry point for building control. The future-proof **UnitronUC32** range provides forward & backward compatibility, meaning an effortless upgrade path for existing **Unitron** Systems.

## Highly programmable and extendable through web-enabled HVAC technology

The **UnitronUC32** range offers an advanced web-based 32-bit architecture, with advanced programmability through the **Unitron Engineering Centre**. Inbuilt diagnostics, along with expanded data logging and strategy storage, is further enhanced by **Uniputs**™, offering up to 8 Universal inputs, up to 8 **Uniputs**™ (AI/DI/AO/DO) and up to 8 **Uniputs**™ with relays.

Cylon CONTROLS

DATASHEET




**Jumper settings**

Pins covered by jumper

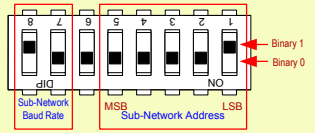
Fieldbus (RS485 sub-network) Terminator

J6 Terminator IN

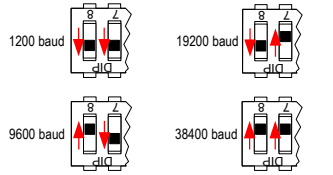
J6 Terminator OUT

J6 Terminator OUT

**Address/Baud-Rate Selector Switch**

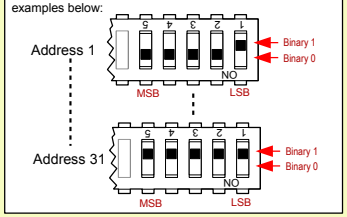



**Sub-Network Baud Rate**




**Sub-Network Address**

The address of the controller on the Sub-Network is set on these DIP switches as binary numbers as illustrated in the examples below:



# Specifications:

## MECHANICAL

| | |
|---|---|
| Size | 118 x 130 x 45 mm<br>(5.7 x 5.12 x 1.78") |
| Enclosure | Injection moulded ABS |
| Mounting | DIN rail |

## ENVIRONMENT

***Note**: This equipment is intended for field installation within another enclosure.*

| | |
|---|---|
| Ambient Temperature | 0° - 50°C (32°-122°F) ambient. |
| Ambient Humidity | 0% - 90% RH non-condensing |
| EMC Immunity | EN 50082-1 |
| EMC Emission | EN 55011 Class B |

## WIRING

***Note**: Use Copper or Copper Clad Aluminium conductors only.*

| | |
|---|---|
| Termination | I/O : PCB mounted screw terminal connections.<br>Power: PCB mounted plug terminal connections. |
| Conductor Area | Max: AWG 12 (3.09 $mm^2$)<br>Min: AWG 22 (0.355 $mm^2$) |

## LABEL

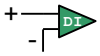
| | |
|---|---|
| Indicators: | 16 numbered red LEDs, one for each input. Light is on when volt free contact is closed. |

## ELECTRICAL

| | |
|---|---|
| Supply Requirements | 24 V AC +/- 20% 50/60 Hz<br>*Note: the UC32.16DI will not operate from a DC supply* |
| Transformer Rating | 10 VA |
| Indicator | Red light is on when power is supplied |

## INPUTS/OUTPUTS

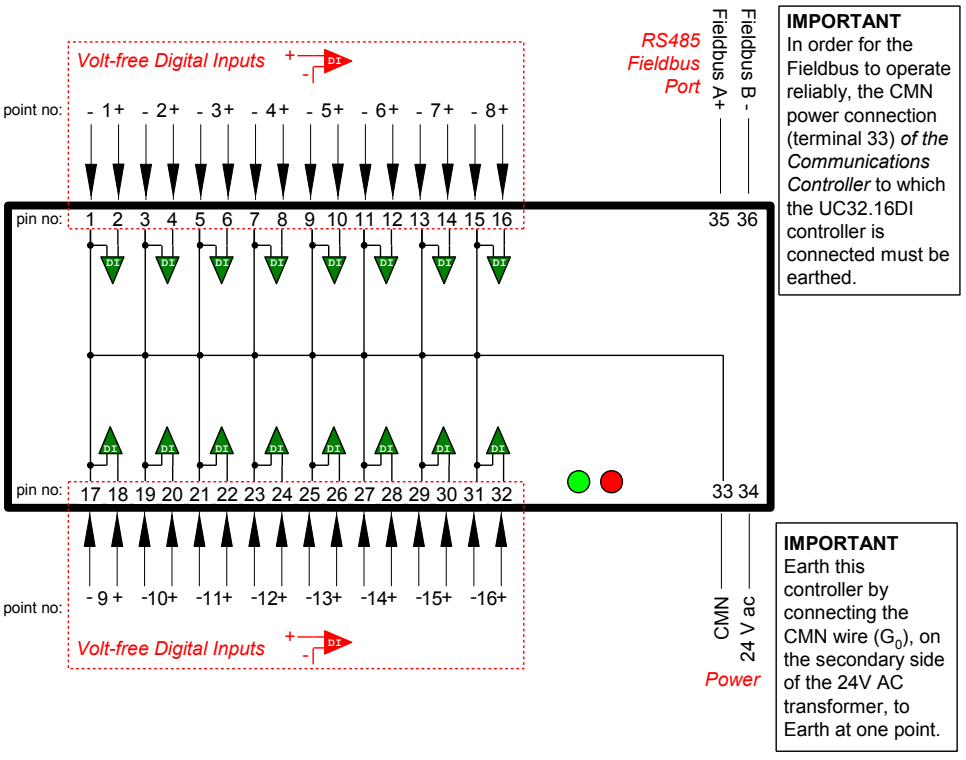
***Note**: Screened cable is recommended for all input connections.*

| | | |
|---|---|---|
| 16 Digital Inputs | All inputs optoisolated from the network and 68HC11. | |
|  | Open Circuit : | 25Vdc (high impedance across input terminals.) |
| | Short Circuit: | 4mA current will flow through the contacts. |
| | Return wire: | Common to all inputs and Go (terminal 33). |

## COMMUNICATIONS

| | |
|---|---|
| Local RS232 TTL port | @ 1200 or 9600 Baud<br>Max cable length 4m |
| Fieldbus port | RS485 @ 1200, 9600, 19200 or 38400 Baud |

*Note: The Input Scan time is approximately equal to the Local Global service time in the Controller. This is related to the number of globals being serviced in the sub-network and the baud rate.*



# UC32.8

The UC32.8 is a programmable controller, with 4 Universal Inputs and 4 UniPut™ + Relay channels. Cylon's UnitronUC32.8 is ideally suitable for main plant control, including AHUs, Boilers, Rooftop units, Lighting etc.


- **4 UniPuts™ + Relays**

  hardware connections that can be used as inputs, outputs, or relays (software selectable)

- **4 Universal Inputs**

  hardware connections that can be used as analog or digital inputs (software selectable)

- **Up to 32 controllers per fieldbus**

- **Flash upgradable firmware**

- **Time-stamped datalogs**

  for increased flexibility and longer monitoring times

- **1024 strategy block**

- **32 datalogs with up to 1024 entries per datalog**

- **Powerful Diagnostics**

  with rapid error-free commissioning technologies

The **UC32.8** controllers are part of the **UnitronUC32** range of products, which offers the following benefits:

## Unique Flexibility with UniPuts™

The **UnitronUC32** range uniquely presents **UniPuts™** - a revolutionary answer to flexible point configuration, offering maximised utilisation of controller capacity along with flexibility in strategy changes. Built on a modern web-based architecture, the **UnitronUC32** range has a wide application scope with the flexibility of being stand-alone or network enabled.

## Cost Effective, low entry point for building control

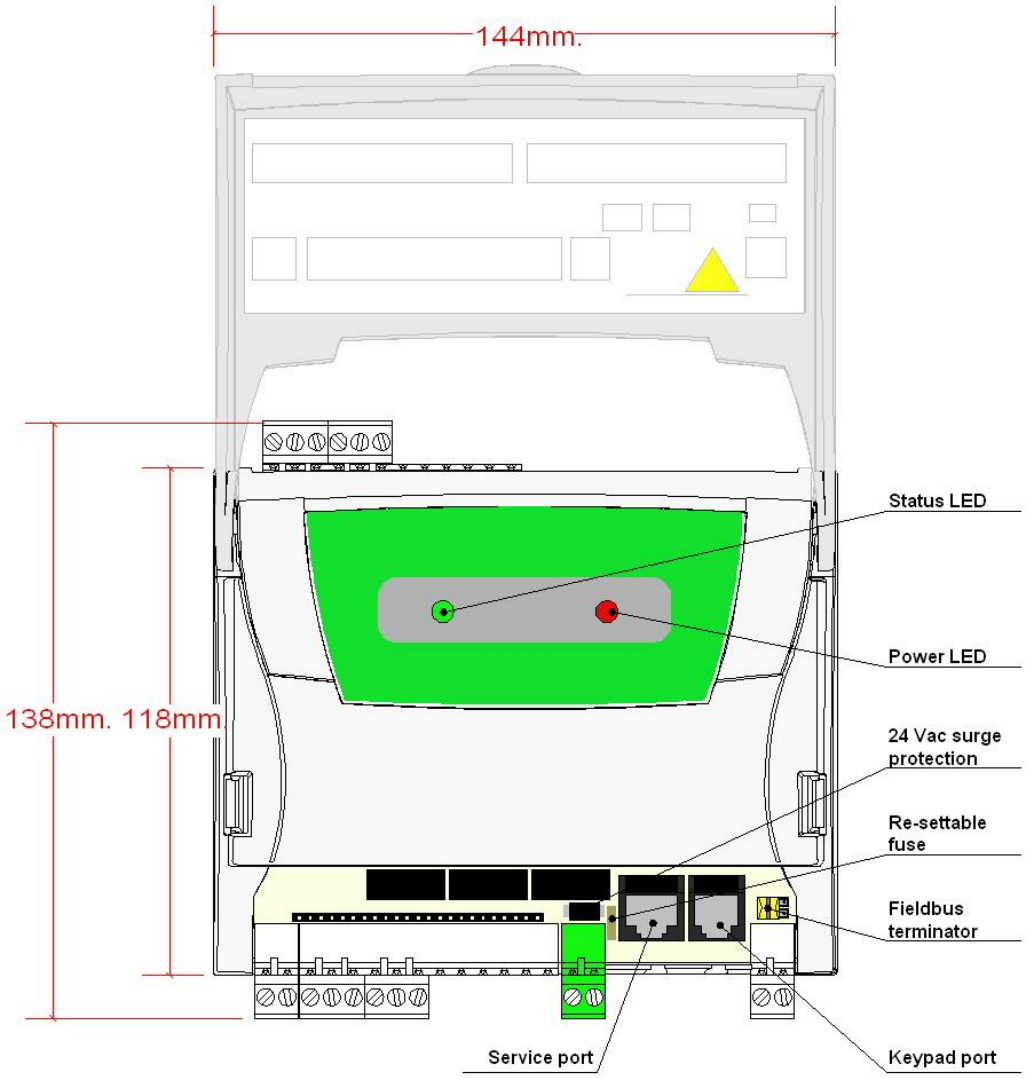
The **UnitronUC32** range offers reduced costs in terms of training, implementation, rollout and maintenance. Modular, extendible packages along with low installation costs mean a low entry point for building control. The future-proof **UnitronUC32** range provides forward & backward compatibility, meaning an effortless upgrade path for existing **Unitron** Systems.

## Highly programmable and extendable through web-enabled HVAC technology

The **UnitronUC32** range offers an advanced web-based 32-bit architecture, with advanced programmability through **the Unitron Engineering Centre**. Inbuilt diagnostics, along with expanded data logging and strategy storage, is further enhanced by **Uniputs**™, offering up to 8 Universal inputs, up to 8 **Uniputs**™ (AI/DI/AO/DO) and up to 8 **Uniputs**™ with relays.

Cylon CONTROLS

DATASHEET




**Note:**

In the kepad version of this controller,

1) pressing the and buttons simultaneously causes the display to toggle between **Configuration** and **Program** modes.

2) pressing the and buttons simultaneously changes the contrast of the LCD screen display .

**Status LED**
(green/orange)

When GREEN, this LED indicates the CPU status.

When ORANGE, this LED indicates that *Manual Override* is active.

**Power LED**
(red)

**Fieldbus Terminator**

OFF
(fieldbus not terminated at this controller)

ON
(fieldbus terminated at this controller)

# Specifications:

## MECHANICAL

| | |
|---|---|
| Size (excluding terminal plugs) | 144 x 118 x 65 mm (5.7 x 4.7 x 2.6") |
| Enclosure | Injection moulded ABS |
| Mounting | DIN rail |

## ENVIRONMENT

***Note**: This equipment is intended for field installation within another enclosure.*

| | |
|---|---|
| Ambient Temperature | 0° - 50°C (32°-122°F) ambient. |
| Ambient Humidity | 0% - 90% RH non-condensing |
| EMC Immunity | EN 50082-1 |
| EMC Emission | EN55011 Class B |

## WIRING

***Note**: Use Copper or Copper Clad Aluminium conductors only.*

| | |
|---|---|
| Termination | PCB mounted plug terminal connections. |
| Conductor Area | Max: AWG 12 (3.09 $mm^2$)<br>Min: AWG 22 (0.355 $mm^2$) |

## ELECTRICAL

| | |
|---|---|
| Supply Requirements | 24 V AC +/- 20% 50/60 Hz |
| Transformer Rating | with UCKRA420: 20 VA<br>without UCKRA420: 15 VA |
| Power Rating | 10 Watts maximum |
| Fuse Rating | 1 A resettable |

## PROCESSOR

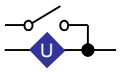
| | |
|---|---|
| Type | Hitachi (Renasas) SuperH SH17034 32-bit RISC |
| Clock Speed | 20 MHz |
| Operating System Memory | 512K flash |
| User Programmable Memory | 512K RAM Battery backed for 2 years minimum<br>plus 256K flash |
| Real-Time Clock | Battery backed for 2 years minimum |

## INPUTS/OUTPUTS

***Note**: Screened cable is recommended for all input connections.*

| | |
|---|---|
| 4 Universal Inputs<br>(Points 1 - 4)<br>  | (Software selectable Interfaces)<br>Active Input 0 – 10 V @ 182 KΩ. 10 bit / 14 bit resolution.<br>Passive Input for a large range of temperature sensors, 10K3A1 sensors are recommended. 14 bit resolution.<br>Active Current Input 0 – 20 mA @ 390 Ohms. 10 bit / 14 bit resolution.<br>Digital Volt-Free contact @ 1 mA continuous.<br>Pulse Counting up to 20 Hz, minimum pulse width 25 mS.<br>Potentiometer input (0 KΩ -10 KΩ, 1 KΩ - 11 KΩ etc). |

*The following UniPut™ features are available with .s32 format strategies created with the Unitron Engineering Centre:*

| | |
|---|---|
| 4 UniPuts™+Relays<br>(Points 17 - 20)<br>  | (Software selectable interfaces)<br>Active Input 0 – 10 V @ 40 KΩ. 9 bit resolution.<br>Active Output 0 – 10 V @ 20 mA max load.<br>Digital Volt-Free contact @ 25 mA not continuous.<br>24 Vac Detect<br>NO 24 Vac Relay contacts, 2 A continuous/ 15 A inrush |

## COMMUNICATIONS

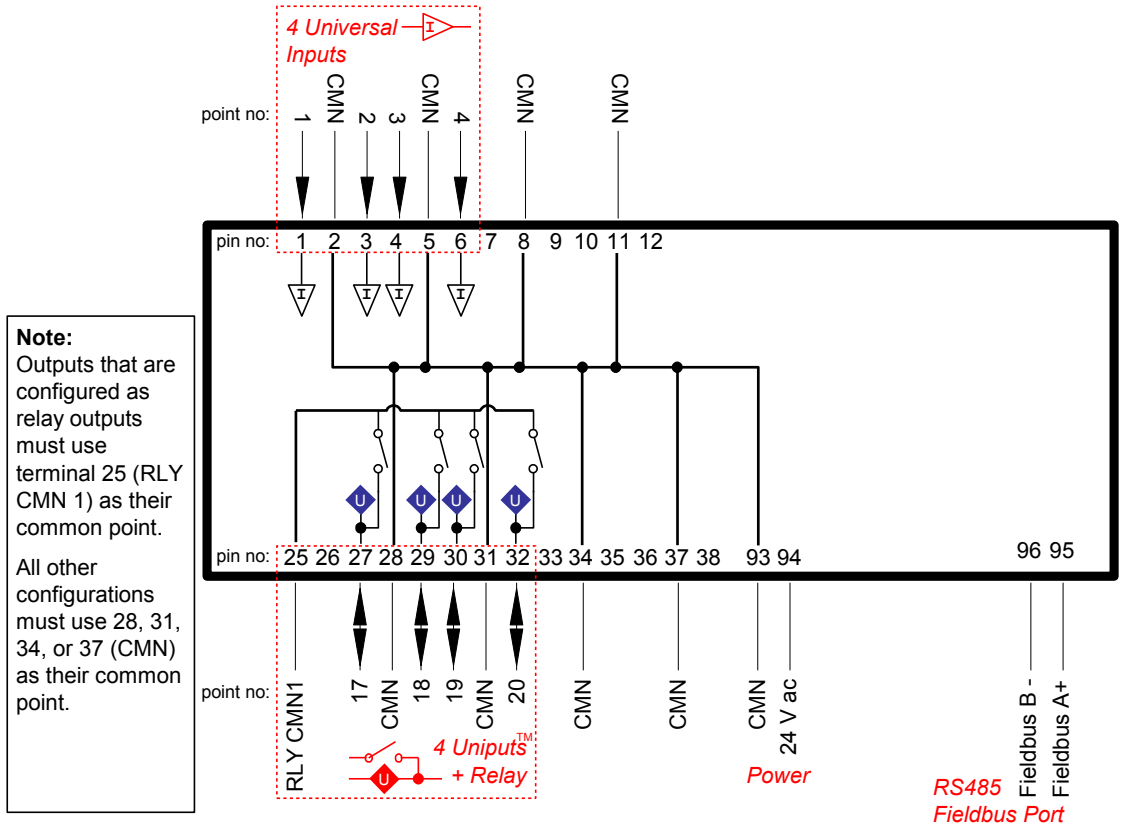
| | |
|---|---|
| RS232 service port | @ 1K2, 2K4, 9K6, 19K2 or 38K4 Baud (defaults to 9K6) [cable: CC20/CAB] |
| Fieldbus RS485 port | @ 1K2, 2K4, 9K6, 19K2, 38K4 or 76K8 Baud (defaults to 38K4) |
| Keypad port | @ 9K6 Baud, RJ11 socket |
| Modem | Modem connection supported through RS232 service port [cable: CC31/CAB] |

## INTERFACE

| | |
|---|---|
| Software | Unitron Command Centre<br>Unitron Engineering Centre<br>WebLink |
| Remote Keypad | UCKRA420 Serial Text Keypad<br>connected via RJ11 port<br>Maximum cable length 50m |

## SOFTWARE FEATURES

| | |
|---|---|
| Configuration Mode (Accessible via Internal or External Keypad/Display device.) | |
| Time Stamped Datalogs | |
| Firmware upgrading via Service port | |
| Maximum Number of Analog Points | 1024 |
| Maximum Number of Digital Points | 1024 |
| Maximum number of strategy blocks | 1024 |
| Maximum number of Datalog Modules | 32 (v 6.1.6 or later) |
| Maximum Controller Address | 32 |
| Maximum Datalog capacity | 1024 entries per Datalog (v 6.1.6 or later) |



# UCU10FC/K

UCK10FC/K: Fancoil Controller with Room Display Support.
The UCU10FC/K adds support for UCU Room Display to the existing Unitary Fancoil Controller.


- Dedicated Room Control Panel connector.
  Frees up 3 input connections by using sensors and control inputs from the Display Panel through a dedicated connector
- 3 Universal Inputs
  can be used as analog or digital inputs
- 2 Universal Outputs
  can be used as analog or digital outputs
- 2 Triac Digital Outputs
  can switch up to 24 Vac
- 3 Relay Digital Outputs
  can switch up to 230 Vac
- Up to 63 controllers per fieldbus
- 190 strategy blocks
- 4 datalogs with up to 102 entries per datalog
- Data security
- Strategy and setpoints backed up in EEPROM

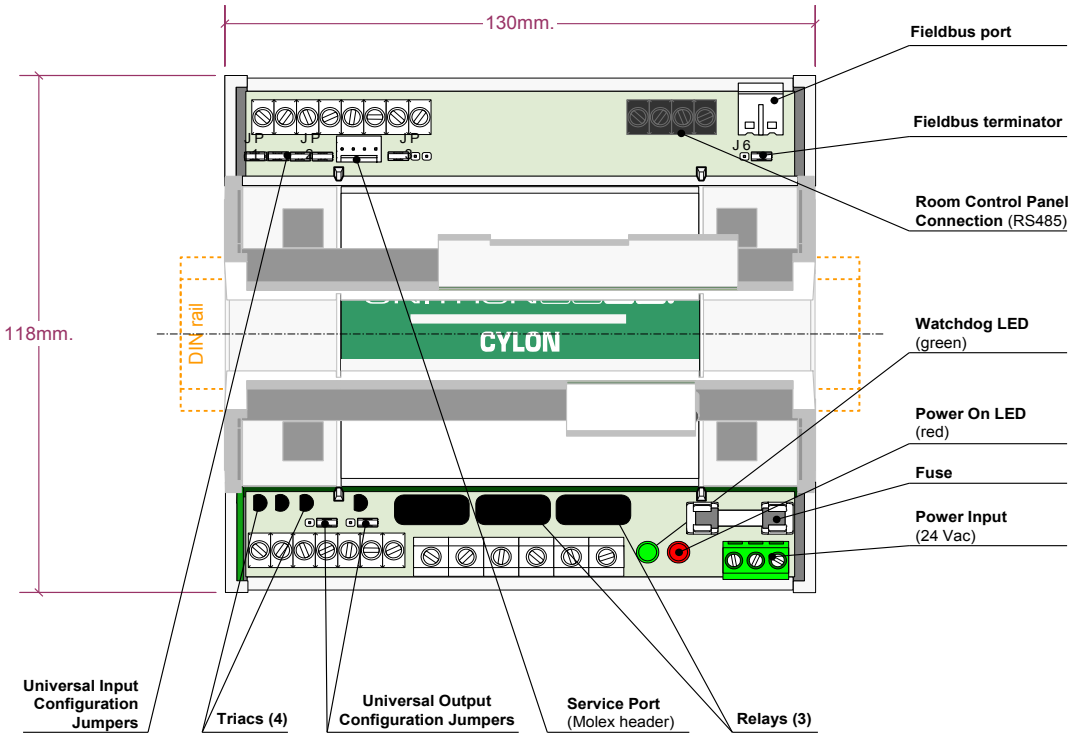
The use of the powerful UCU10FC/K Field Controller in this system means that while the Room Display can be used for local control, the fancoil equipment can be easily networked into the overall building control by simply connecting the UCU10FC/K to the Unitron Network.

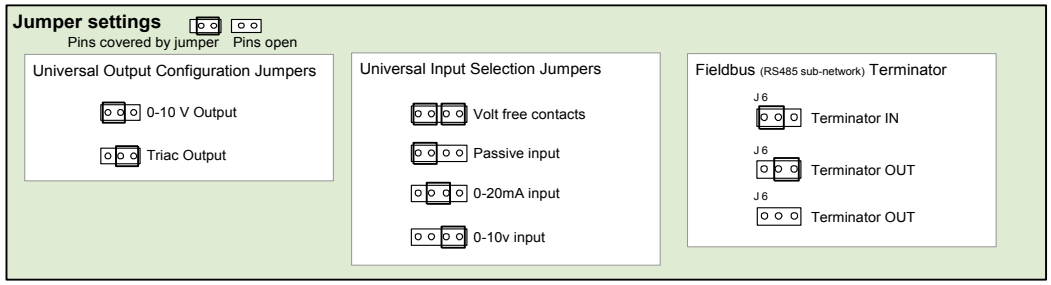
An RS485 serial connector is provided to allow connection to the UCU Room Display module. This has the advantage that all mains cabling is contained within the Fancoil equipment.

## Applications

For controlling the room temperature in individual rooms and zones

DATASHEET




## Strategy point setup

| Type | Number | Use | Values |
|---|---|---|---|
| Analog | 255 | Temperature Setpoint | 15-30 Deg C, 59-86 Deg F |
| Analog | 254 | Upper Setpoint Limit | 15-30 Deg C, 59-86 Deg F |
| Analog | 253 | Lower Setpoint Limit | 15-30 Deg C, 59-86 Deg F |
| Analog | 252 | Fan Speed | 0 = off, 1 = low, 2 = medium, 3 = high |
| Analog | 251 | Room Temperature in | -40.0 – 959.9 Deg C/Deg F |
| Analog | 250 | Control Flags | *(See description below)* |
| Analog | 249 | Power Mode | 0 = off, 1 = standby, 2 = comfort |
| Analog | 248 | Room Temperature out | -40.0 – 959.9 Deg C/Deg F |
| Digital | 255 | Operational Mode | 0 = heating, 1 = cooling |
| Digital | 254 | Keypad Link Status | 0 = offline, 1 = online |
| Digital | 252 | Manual Fan Control | 0 = automatic, 1 = manual |
| Digital | 251 | Fan Type | 0 = three speed fan, 1 = single speed fa |

**Control Flags (analog point 250) :** Analog point 250 is used to specify all of the Control Flags. This is set in the Controller and sent from the Controller to the display. A value between 0 and 127 is used to represent the following bit pattern for Flag values:

**bit 0 :: Manual fan disable flag :** When this flag is set, the keypad will allow the user adjust the setpoint value but not the fan speed. If the user tries to change fan speed when this flag is set, the word "no" is displayed in order to give a feedback (assuming fan display inhibit flag is NOT set).

**bit 1 :: Fan display inhibit :** When this flag is set and the manual fan disable flag is set, the keypad does not display any fan status information. This allows for operation in VAV type applications where there is no requirement for user fan adjustment or status. If the manual fan disable flag is clear this flag is ignored.

**bit 2 :: Power control flag :** When this flag is set the user is not allowed to change the current power mode (i.e. comfort, standby, off). This is for out of occupancy lockdown.

**bit 3 :: Local echo flag :** When this flag is set the keypad will update the local display based on the users input without waiting for the update acknowledge from the UCU. This may improve the apparent user responsiveness of the display but could lead to some glitches if the UCU needs to vet user responses and override them.

**bit 4 :: Fahrenheit/Celsius flag :** This is set by the UCU and used by the display to decide which temperature units to use.

**bit 5 :: Error lockout flag :** When this flag is set, all keypad functionality is disabled, and the "Err3" code is displayed to indicate a fancoil error state.

**bit 6 :: room temperature override flag :** When this flag is set, the keypad will display the temperature value supplied by the Controller instead of the value from the keypad's internal temperature sensor. This would allow the use of external temperature sensors attached to the Controller or would allow the Controller adjust the temperature from the keypad sensor to compensate for errors.

# Specifications

## MECHANICAL

| | |
|---|---|
| Size (excluding terminal plugs) | 145 x 130 x 45 mm (5.7 x 5.12 x 1.78") |
| Enclosure | Injection moulded ABS |
| Mounting | DIN rail |

## FIELD CONTROLLER::ENVIRONMENT

***Note**: This equipment is intended for field installation within another enclosure.*

| | |
|---|---|
| Ambient Temperature | 0° - 50°C (32°-122°F) ambient. |
| Ambient Humidity | 0% - 90% RH non-condensing |
| EMC Immunity | EN 50082-1 |
| EMC Emission | EN 55011 Class B |
| Safety | EN 61010 |

## WIRING

***Note**: Use Copper or Copper Clad Aluminium conductors only.*

| | |
|---|---|
| Termination | I/O and Power : PCB mounted screw terminal connections.<br>Fieldbus : PCB mounted plug terminal connections. |
| Conductor Area | Max: AWG 12 (3.09 $mm^2$)<br>Min: AWG 22 (0.355 $mm^2$) |

## ELECTRICAL

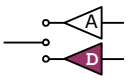
| | |
|---|---|
| Supply Requirements | 24 V AC +/- 20% 50/60 Hz |
| Transformer Rating | up to 55 VA<br>(up to 10 VA internal power plus up to 45 VA supplied to Triac loads) |
| Fuse Rating | 2 A 250 V anti-surge(250 Vac – 2 AT) |

## PROCESSOR

| | |
|---|---|
| Type | Motorola 68HC11 |
| Clock Speed | 8 MHz |
| Operating System Memory | 128K |
| User Programmable Memory | 32k x 8 RAM<br>8k x 8 EEPROM backup for program.<br>Maintenance free. |

## INPUTS/OUTPUTS

***Note**: Screened cable is recommended for all input connections.*

| | |
|---|---|
| 3 Universal Inputs   | Active voltage input 0-10 V @ 134 K.<br>Passive Input for a large range of temperature sensors, 10K3A1 sensors are recommended.<br>***Note:** '10k option' controllers use 10k3A1 sensors only.*<br>Temperature input range: 0 – 50 °C<br>Active current input 0-20 mA @ 120 Ω (screened cable).<br>Digital Volt Free Contact.<br>***Note:** UCU Universal inputs do not support pulse counting.* |
| 2 Universal Outputs   | Each A/T output is either one Analog 0-10 V, or one Digital.<br>As analog, both are 0-10 V, 10 mA, 3 second response.<br>As digital, both are rated @ 400 mA maximum, switch neutral only. |
| 2 Digital Triac Outputs   | 24 V AC Triac @ 500 mA maximum.<br>Switch neutral only. |
| 3 Digital Relay Outputs  | 230 V AC<br>Maximum Load: 2A inductive/resistive load |
| 24 V AC output terminals | Total current drawn from 24 V AC terminals is limited to 1.8 A. |

## COMMUNICATIONS

***Note:*** *The default Fieldbus baud rate is 38400. The baud rate may be changed using the Unitron Palmtop program (DOS)*

| | |
|---|---|
| Local RS232 TTL port | @ 9600 Baud<br>Max cable length 4m |
| Fieldbus port | RS485 @ 1200, 9600, 19200 or 38400 Baud |
| Keypad Port | RS485 @ 9600 Baud<br>Max cable length 25m |

## INTERFACE

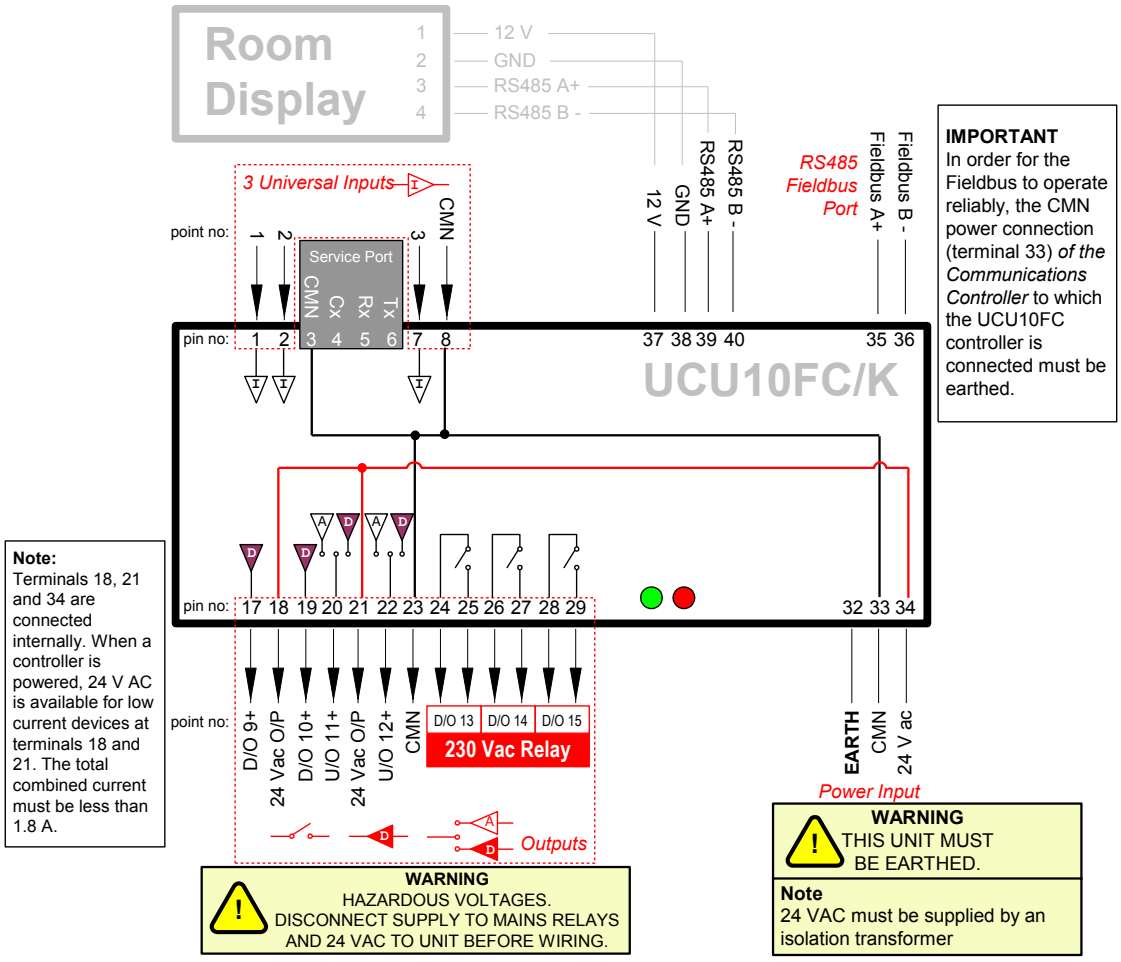
| | |
|---|---|
| Software | Unitron Command Centre<br>Unitron Engineering Centre<br>WebLink |

## SOFTWARE FEATURES

***Note:*** *The controller's Fieldbus address is set by Unitron Command Centre's CCView software module (Windows), or Unitron Palmtop program (DOS)*

| | |
|---|---|
| Maximum Controller Address | 63 |
| Maximum number of Strategy Blocks | 190 |
| Maximum number of Datalog Modules | 4 |
| Maximum Datalog capacity (standard) | 102 |
| Data Security | Strategy and Point numbers 200 – 255 analog and digital backed up in EEPROM |

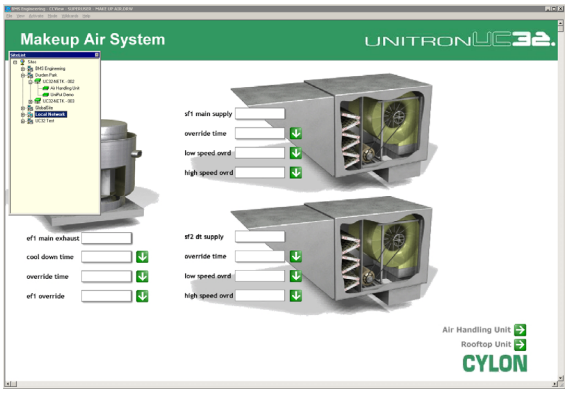
# Cabling



# CYLON

## Unitron Command Centre

**Unitron Command Centre** is a set of software applications that act as an interface to **Unitron** I/O Controllers and Network Controllers on a BMS site. The **Unitron Command Centre** is designed to allow building supervisors to view and adjust conditions on their site.




- Graphic view of your site
- Manage complex sites through simple graphical interface
- View and set Datalogs, Alarms and Time schedules
- Compatible with all Unitron and UnitronUC32 controllers
- Secure
- User-friendly

The **Unitron Command Centre** is part of the **UnitronUC32** range of products, which offers the following benefits:

### Unique Flexibility with UniPut™ I/O

The UnitronUC32 range uniquely presents UniPut I/O, a revolutionary answer to flexible point configuration, offering maximized utilisation of controller capacity along with flexibility in strategy changes. Built on a modern, web-based architecture, the UnitronUC32 range has a wide application scope with the flexibility of being stand-alone or network enabled. Easily customisable, the UnitronUC32 range has optional internal or external keypads for a powerful yet user-friendly interface, matched by extensive monitoring and logging capabilities.

### The right integration at the right level

The Unitron UC32 solution provides a wide choice of integration options including BACnet, Modbus, M-Bus, KNX, and OPC. Cylon's philosophy is to provide an open system that is truly future proof. With Modbus, M-Bus and KNX, Cylon offers high performance Fieldbus integration. BACnet is the international standard that provides peer to peer integration over TCP/IP. OPC Server extends UnitronUC32 integration beyond building services.

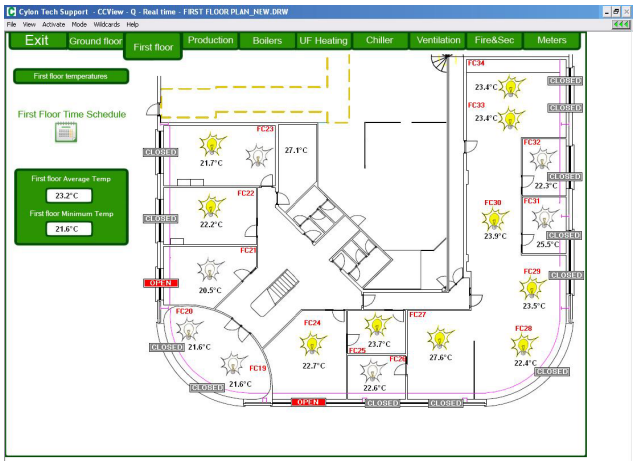
UNITRONUC32.
**Building Management System**

# FEATURES

## Real-Time Displays.

Graphic screens can be developed using any drawing package capable of generating a BMP file format.

- Supports the use of scanned pictures.
- Supports animated graphics
- Graphic screens can access objects for text, real-time values, logs, graphs, schedule objects, and links to other graphic screens
- Modifying common application objects, such as set points can be done graphically
- Commands to start and stop binary objects can be done by clicking the selected object and selecting the appropriate command from the pop-up menu. No entry of text required




## Browser-like functionality

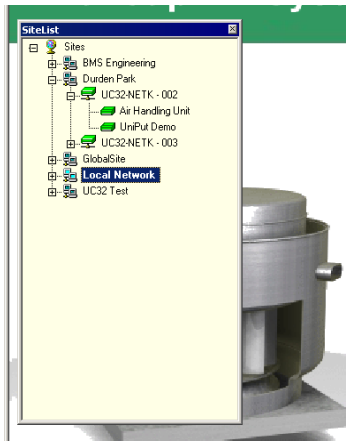
For ease of navigation, hyperlinks within the Real-Time display allow an operator to perform tasks with a minimum knowledge of the HVAC Control System and basic computing skills.

Links can also be provided to external HTML pages, Word Documents or Adobe Acrobat PDF files - for example operating and maintenance manuals.

## "Tree" view

An explorer-like 'tree' display is available for quick viewing of, and access to, the hierarchical structure of the system database.

With this tool the structure is immediately obvious, and users can navigate to remote sites, select drawings, call datalogs etc. from any point within the UnitronUC32 system.



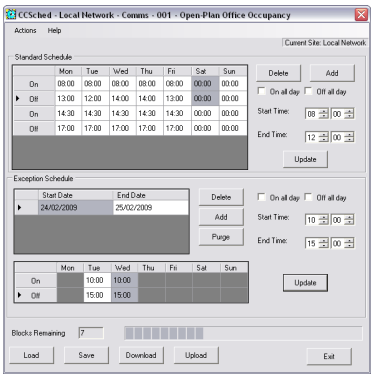

## Text View

The Command Centre's text view gives direct access to system values and adjustments. This allows the system to be supervised effectively without graphics.

## Scheduling

Events within the UnitronUC32 system can be triggered according to internal Time Schedules.

The Unitron Command Centre controls UnitronUC32 scheduled events using a Schedule Planner application for individual time zone control, and a Time Schedule Manager for grouping of schedules.




## Reporting

The Unitron Command Centre includes a reports package for collecting data and processing reports.

Reports can be time, date or event triggered. This means that historical data can be built up automatically, and external applications can be run to create complex reports in any format.

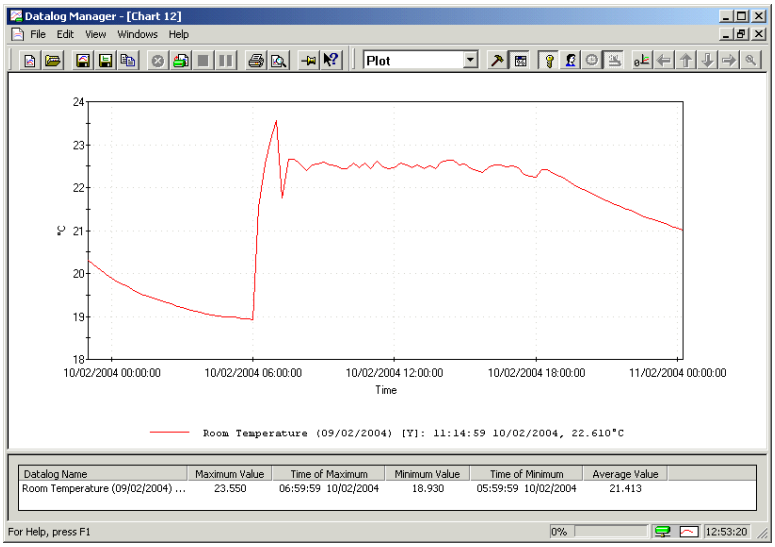
Historical data can also be exported to data analysis or metering applications, and can be stored as CSV or ODBC / SQLServer format

## Exporting to WebLink

Unitron WebLink allows UnitronUC32 sites to be supervised from any Web browser over TCP/IP. WebLink interfaces can be created by automatically exporting a completed graphical user directly from the Unitron Command Centre - using one simple 'Save as HTML' command. This allows a web-enabled supervisory system to be created quickly and easily.

## Datalog display

- 6 graphs per window
- Optional statistics window for all on all charts. This includes min value, max value, average value and standard deviation.
- Charts can be exported in JPEG format for use in reports.
- Graphs can be viewed as 2D or 3D bar and pie charts.
- Multiple charts can be compared in text format.

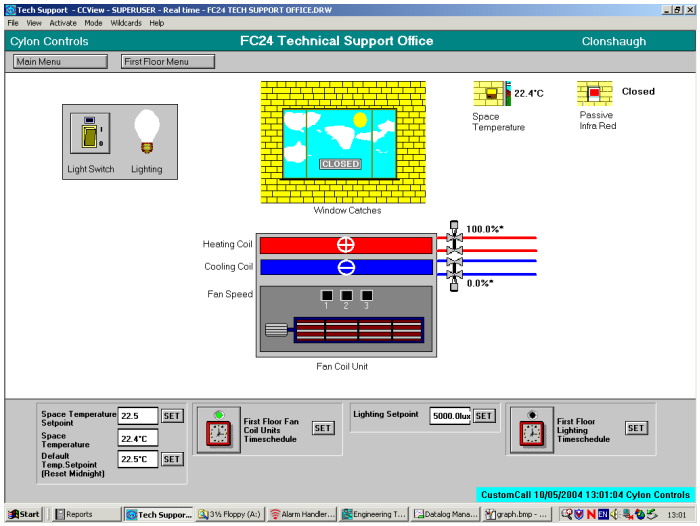



## Security

- A user must provide a username and password in order to gain access to the system. This defines the user's access for viewing and/or changing system conditions.
- Operator is automatically logged off if no keyboard or mouse activity is detected.
- All system security data is stored in an encrypted format.

## Generic Drawings

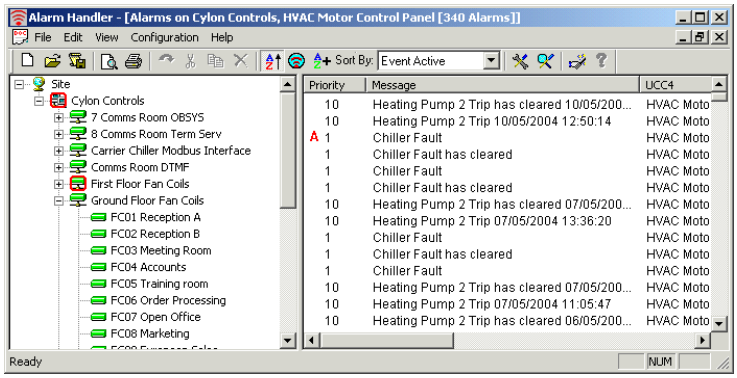
A single graphic can be set up so that it can be redirected to any one of several controllers - deal for Fancoil and VAV applications, where a single plant drawing can be used to supervise many pieces of equipment throughout a site.




## Alarms

The system automatically monitors the operation of all workstations, network connections, building management panels, and controllers. The failure of any device is notified to the operator by an Alarm message.

- The Alarms window notifies the operator of an alarm condition, and allows the operator to view details of the alarm and acknowledge the alarm.
- Different alarm priorities can be displayed in different colours.




- A graphic screen can be displayed when an alarm occurs.
- With a single click, Alarms can be sorted by priority, time of event and where the alarm occurred.
- A "tree" of areas is available to allow the user to easily drill down to alarms in a specified area.
- Alarms can be transmitted to a Pager or to a mobile phone, using SMS.

## Connection

The Unitron Command Centre communicates with the UnitronUC32 controller network locally via either RS232 or Ethernet TCP/IP connections.

Remote sites can be integrated using Modem and/or WAN (TCP/IP) connection, including dial-back alarms.

The Command Centre can also has a Client-Server option, allowing it to connect to other Command Centre installations.

# SYSTEM REQUIREMENTS

| | |
|---|---|
| Minimum PC | Intel Core 2 Duo E6300 processor, 1Gb RAM, 80Gb hard disk |
| Recommended PC | Intel Core 2 Duo E6600 processor, 2Gb RAM, 160Gb hard disk |
| Operating System | WindowsXP Professional with Service Pack 2 or later<br>Windows Vista is not supported |

# UC32.16

The UC32.16 is a programmable controller, with 8 Universal Inputs and 8 UniPut™ + Relay channels. Cylon's UnitronUC32.16 is ideally suitable for main plant control, including AHUs, Boilers, Rooftop units, Lighting etc.


- **8 UniPuts™ + Relays**

  hardware connections that can be used as inputs, outputs, or relays (software selectable)

- **8 Universal Inputs**

  hardware connections that can be used as analog or digital inputs (software selectable)

- **Up to 16 controllers per fieldbus**

- **Flash upgradable firmware**

- **Time-stamped datalogs**

  for increased flexibility and longer monitoring times

- **1024 strategy block**

- **32 datalogs with up to 1024 entries per datalog**

- **Powerful Diagnostics**

  with rapid error-free commissioning technologies

The **UC32.16** controllers are part of the **UnitronUC32** range of products, which offers the following benefits:

## Unique Flexibility with UniPuts™

The **UnitronUC32** range uniquely presents **UniPuts™** - a revolutionary answer to flexible point configuration, offering maximised utilisation of controller capacity along with flexibility in strategy changes. Built on a modern web-based architecture, the **UnitronUC32** range has a wide application scope with the flexibility of being stand-alone or network enabled.

## Cost Effective, low entry point for building control

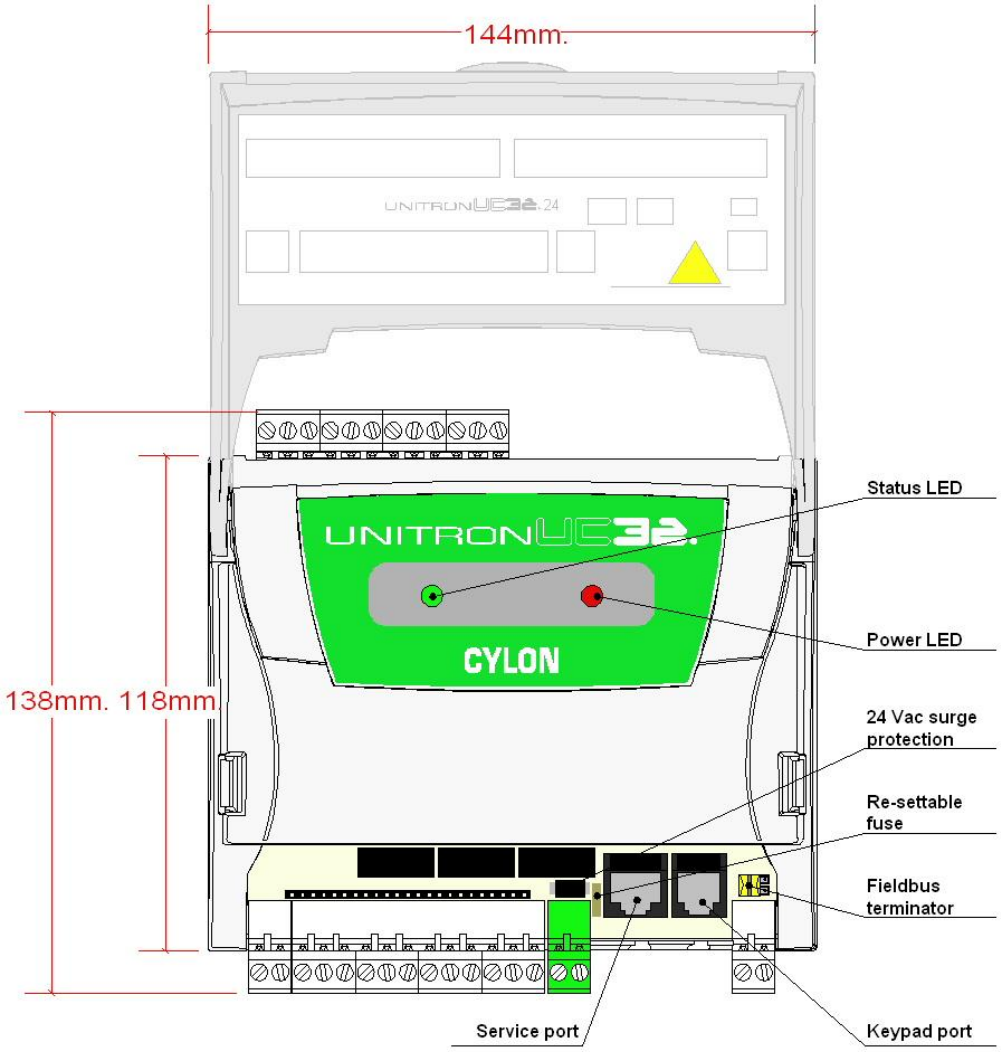
The **UnitronUC32** range offers reduced costs in terms of training, implementation, rollout and maintenance. Modular, extendible packages along with low installation costs mean a low entry point for building control. The future-proof **UnitronUC32** range provides forward & backward compatibility, meaning an effortless upgrade path for existing **Unitron** Systems.

## Highly programmable and extendable through web-enabled HVAC technology

The **UnitronUC32** range offers an advanced web-based 32-bit architecture, with advanced programmability through **the Unitron Engineering Centre**. Inbuilt diagnostics, along with expanded data logging and strategy storage, is further enhanced by **Uniputs**™, offering up to 8 Universal inputs, up to 8 **Uniputs**™ (AI/DI/AO/DO) and up to 8 **Uniputs**™ with relays.

Cylon CONTROLS

DATASHEET




**Note:**

In the kepad version of this controller,

1) pressing the △ and ✓ buttons simultaneously causes the display to toggle between **Configuration** and **Program** modes.

2) pressing the ▽ and ✓ buttons simultaneously changes the contrast of the LCD screen display .

**Status LED**
(green/orange)

When GREEN, this LED indicates the CPU status.

When ORANGE, this LED indicates that *Manual Override* is active.

**Power LED**
(red)

**Fieldbus Terminator**

OFF
(fieldbus not terminated at this controller)

ON
(fieldbus terminated at this controller)

# Specifications:

## MECHANICAL

| | |
|---|---|
| Size (excluding terminal plugs) | 144 x 118 x 65 mm (5.7 x 4.7 x 2.6") |
| Enclosure | Injection moulded ABS |
| Mounting | DIN rail |

## ENVIRONMENT

*Note: This equipment is intended for field installation within another enclosure.*

| | |
|---|---|
| Ambient Temperature | 0° - 50°C (32°-122°F) ambient. |
| Ambient Humidity | 0% - 90% RH non-condensing |
| EMC Immunity | EN 50082-1 |
| EMC Emission | EN55011 Class B |

## WIRING

*Note: Use Copper or Copper Clad Aluminium conductors only.*

| | |
|---|---|
| Termination | PCB mounted plug terminal connections. |
| Conductor Area | Max: AWG 12 (3.09 $mm^2$)<br>Min: AWG 22 (0.355 $mm^2$) |

## ELECTRICAL

| | |
|---|---|
| Supply Requirements | 24 V AC +/- 20% 50/60 Hz |
| Transformer Rating | with UCKRA420: 20 VA<br>without UCKRA420: 15 VA |
| Power Rating | 10 Watts maximum |
| Fuse Rating | 1 A resettable |

## PROCESSOR

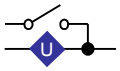
| | |
|---|---|
| Type | Hitachi (Renasas) SuperH SH17034 32-bit RISC |
| Clock Speed | 20 MHz |
| Operating System Memory | 512K flash |
| User Programmable Memory | 512K RAM Battery backed for 2 years minimum plus 256K flash |
| Real-Time Clock | Battery backed for 2 years minimum |

## INPUTS/OUTPUTS

*Note: Screened cable is recommended for all input connections.*

| | |
|---|---|
| 8 Universal Inputs (Points 1 - 8)  | (Software selectable Interfaces)<br>Active Input 0 – 10 V @ 182 KΩ. 10 bit / 14 bit resolution.<br>Passive Input for a large range of temperature sensors, 10K3A1 sensors are recommended. 14 bit resolution.<br>Active Current Input 0 – 20 mA @ 390 Ohms. 10 bit / 14 bit resolution.<br>Digital Volt-Free contact @ 1 mA continuous.<br>Pulse Counting up to 20 Hz, minimum pulse width 25 mS.<br>Potentiometer input (0 KΩ -10 KΩ, 1 KΩ - 11 KΩ etc). |

*The following UniPut™ features are available with .s32 format strategies created with the Unitron Engineering Centre:*

| | |
|---|---|
| 8 UniPuts™+Relays (Points 17 - 24)  | (Software selectable interfaces)<br>Active Input 0 – 10 V @ 40 KΩ. 9 bit resolution.<br>Active Output 0 – 10 V @ 20 mA max load.<br>Digital Volt-Free contact @ 25 mA not continuous.<br>24 Vac Detect<br>NO 24 Vac Relay contacts, 2 A continuous/ 15 A inrush |

## COMMUNICATIONS

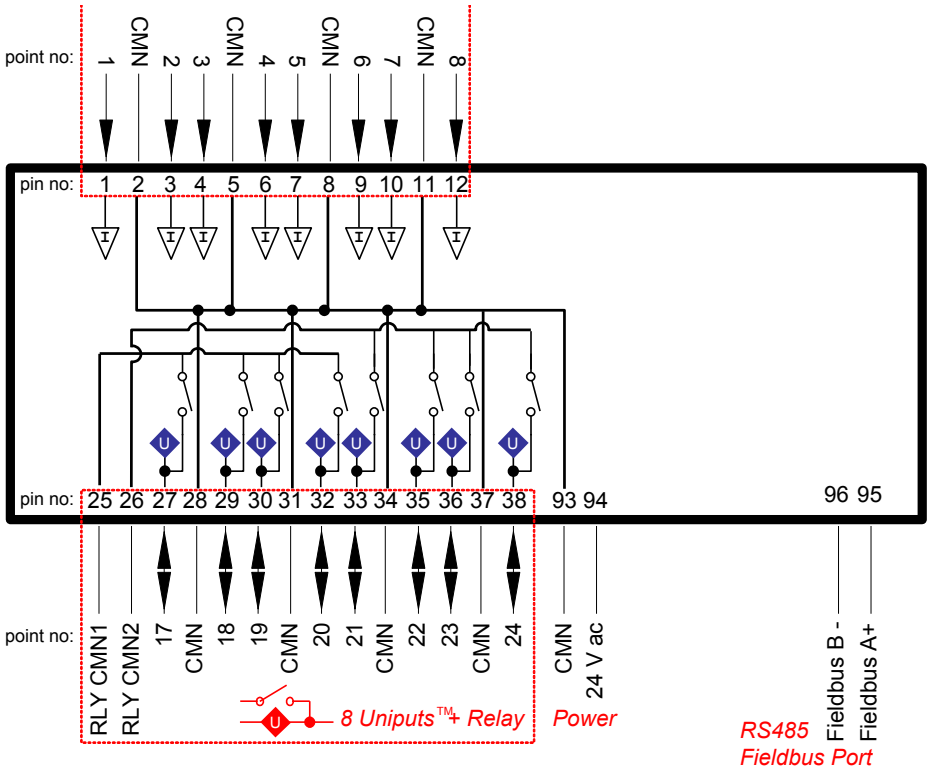
| | |
|---|---|
| RS232 service port | @ 1K2, 2K4, 9K6, 19K2 or 38K4 Baud (defaults to 9K6) [cable: CC20/CAB] |
| Fieldbus RS485 port | @ 1K2, 2K4, 9K6, 19K2, 38K4 or 76K8 Baud (defaults to 38K4) |
| Keypad port | @ 9K6 Baud, RJ11 socket |
| Modem | Modem connection supported through RS232 service port [cable: CC31/CAB] |

## INTERFACE

| | |
|---|---|
| Software | Unitron Command Centre<br>Unitron Engineering Centre<br>WebLink |
| Remote Keypad | UCKRA420 Serial Text Keypad<br>connected via RJ11 port<br>Maximum cable length 50m |

## SOFTWARE FEATURES

| | |
|---|---|
| Configuration Mode (Accessible via Internal or External Keypad/Display device.) | |
| Time Stamped Datalogs | |
| Firmware upgrading via Service port | |
| Maximum Number of Analog Points | 1024 |
| Maximum Number of Digital Points | 1024 |
| Maximum number of strategy blocks | 1024 |
| Maximum number of Datalog Modules | 32 (v 6.1.6 or later) |
| Maximum Controller Address | 16 |
| Maximum Datalog capacity | 1024 entries per Datalog (v 6.1.6 or later) |




**Note:**
Outputs that are configured as relay outputs must use either terminal 25 (RLY CMN 1) or terminal 26 (RLY CMN2) as their common point.

All other configurations must use 28, 31, 34, or 37 (CMN) as their common point.

data SHEET

# 5-Port BAS Switch

## *Ethernet Built for Buildings*

An expanding need exists for Ethernet switches in many Building Automation Systems (BAS). The 5-port Plug-and-Play (PnP) BAS Switch is ideal for low-cost 10/100 Mbps Ethernet switching applications where equipment is mounted in shallow-depth control cabinets.

No configuration is needed. Each port automatically sets its data rate and duplex using the Auto-negotiation protocol. Communication matches the capability of the link partner: either 10 Mbps or 100 Mbps and either half- or full-duplex. Each port adapts to either a straight-through or crossover cable using the Auto-MDIX protocol. There is no need to stock crossover cables for switch-to-switch cabling.

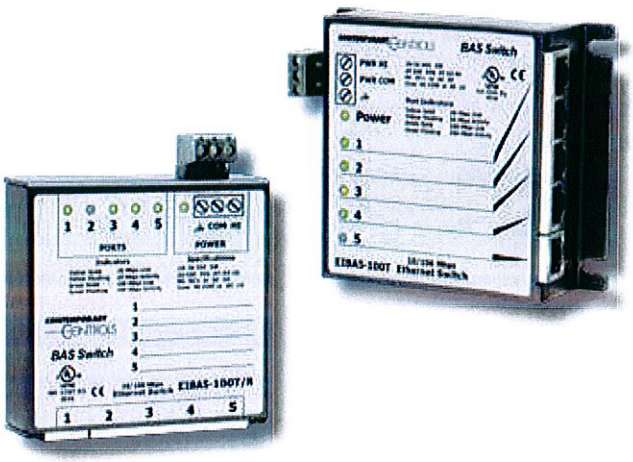
Each unit is housed in a rugged metal enclosure and can be either panel or DIN-rail mounted. A writable label allows listing the location of field devices connected to each port.

The half-wave rectified low-voltage power supply allows sharing 24 VAC/VDC with other devices. LEDs for data rate and activity aid in troubleshooting.

Unlike office-grade Ethernet equipment which is not adaptable to control panels, the BAS Switch makes an Ethernet installation neat, professional, and dependable.

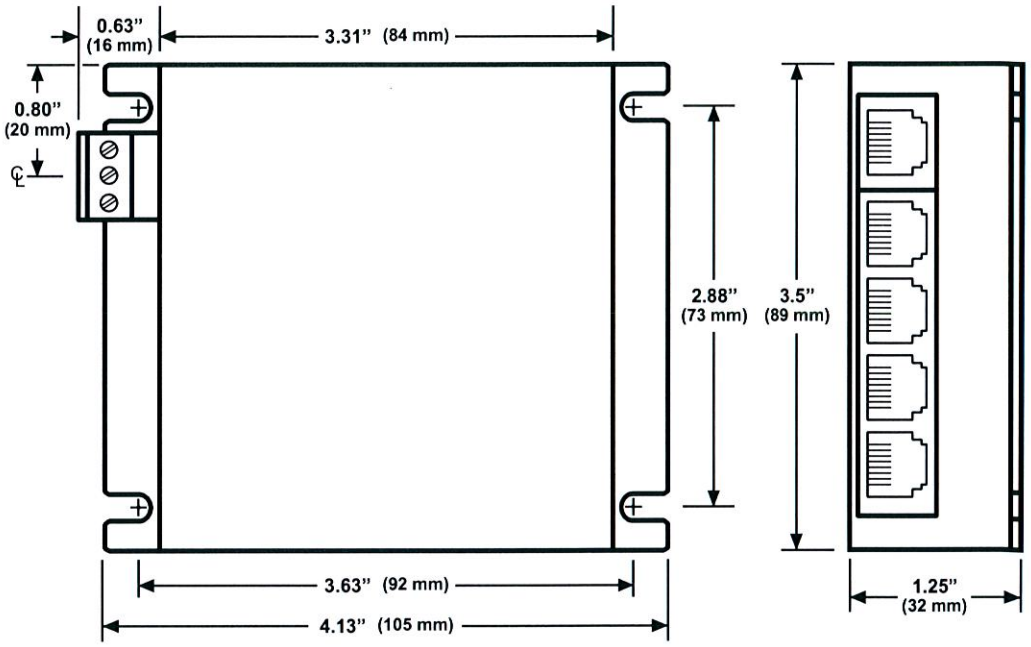
### Simple to Install and Use ...

- DIN-rail and panel-mountable versions
- Auto-MDIX and auto-negotiated communication
- Industrial temperatures: 0°C to +60°C
- 10BASE-T/100BASE-TX compliant
- Industrial environment EMC compatible
- UL 508 Listed, Industrial Control Equipment
- CE Mark and RoHS compliant
- Diagnostic LEDs
- 10–36 VDC and 24 VAC (± 10%) 47–63 Hz
- Power through a quick-disconnect terminal strip
- Writable label for listing connected devices

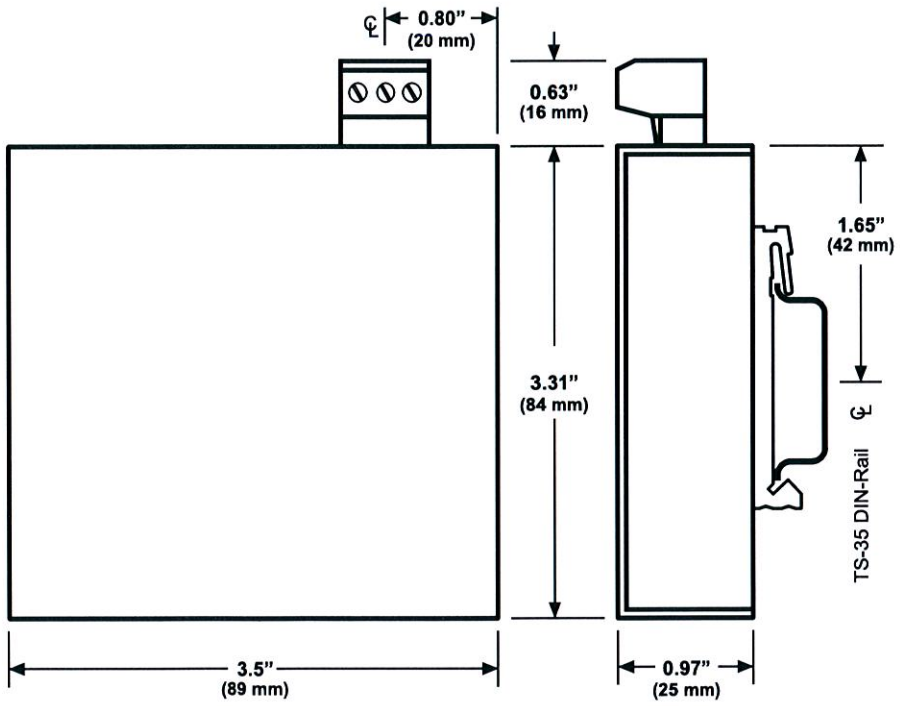



CTRLink®

## Mechanical Drawings




EIBA5-100T Panel Mount



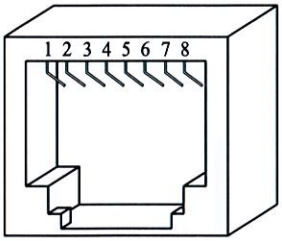

EIBA5-100T/R Din-rail Mount

# Specifications

| | |
|---|---|
| ***Power Requirements*** | 10–36 VDC 3 W or 24 VAC ±10% 6 VA 47–63 Hz |
| ***Operating Temperature*** | 0°C to 60°C |
| ***Storage Temperature*** | –40°C to 85°C |
| ***Relative Humidity*** | 10–95%, non-condensing |
| ***Protection*** | IP30 |
| ***Mounting*** | TS-35 DIN-rail |
| ***Shipping Weight*** | 1 lb (0.45 kg) |
| ***Ethernet Communications*** | IEEE 802.3 10/100 Mbps data rate<br>using RJ-45 connectors, 100 m (max) |
| ***LEDs*** | Power: Green = power OK<br>Port LEDs: Green = 100 Mbps communication established<br>Yellow = 10 Mbps communication established<br>Flashing = data transmissions occurring |
| ***Regulatory Compliance*** | CE Mark; CFR 47, Part 15 Class A; RoHS;<br>UL 508 Industrial Control Equipment |

## *RJ-45 Connector Pin Assignments*

| Pin | Function |
|---|---|
| 1 | TD+ |
| 2 | TD– |
| 3 | RD+ |
| 4 | Not Used |
| 5 | Not Used |
| 6 | RD– |
| 7 | Not Used |
| 8 | Not Used |

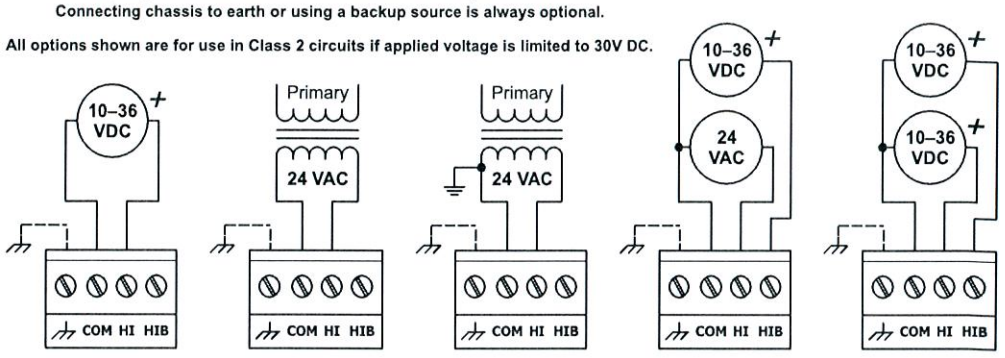


## Power Considerations

Applied voltage must be in the specified range and deliver a current commensurate with power consumption. The recommended size for solid power conductors is 16–20 AWG; and for stranded conductors use 16–18 AWG. Zero volts (COM) is isolated from chassis (earth). Input connections are reverse-polarity protected.

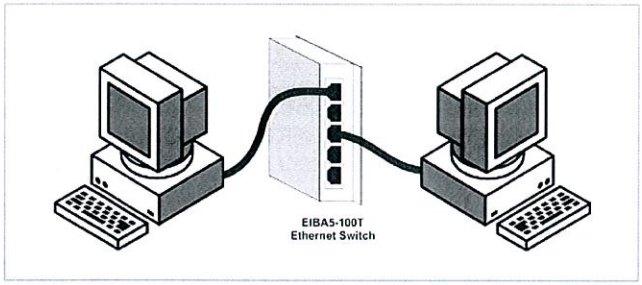
**Input power: 10–36 VDC or 24 VAC ± 10%, 47–60 Hz.**
**Connecting chassis to earth or using a backup source is always optional.**

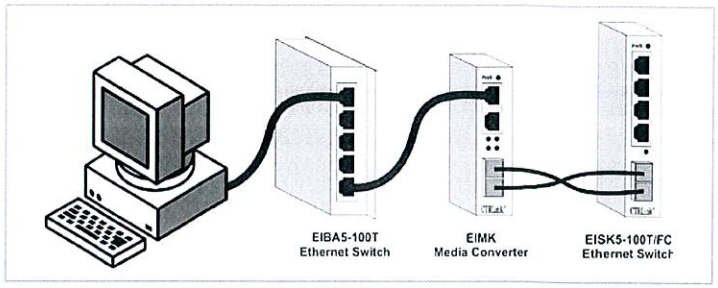
**All options shown are for use in Class 2 circuits if applied voltage is limited to 30V DC.**




**DC Powered** | **AC Powered** | **AC Powered with Grounded Secondary** | **AC Powered with DC Backup** | **Redundant DC Powered**

## Typical Switch Installations




## Ordering Information

| *Model* | *Description* |
|---|---|
| EIBA5-100T | Five-port 10BASE-T/100BASE-TX switching hub, panel mount |
| EIBA5-100T/R | Five-port 10BASE-T/100BASE-TX switching hub, DIN-rail mount |

## Accessories

| *Model* | *Description* |
|---|---|
| AI-XFMR | Wall-mount plug-in transformer, 120 VAC input/24 VAC output (nominal values) |
| AI-XFMR-E | Wall-mount plug-in transformer, 230 VAC input/24 VAC output (nominal values) |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