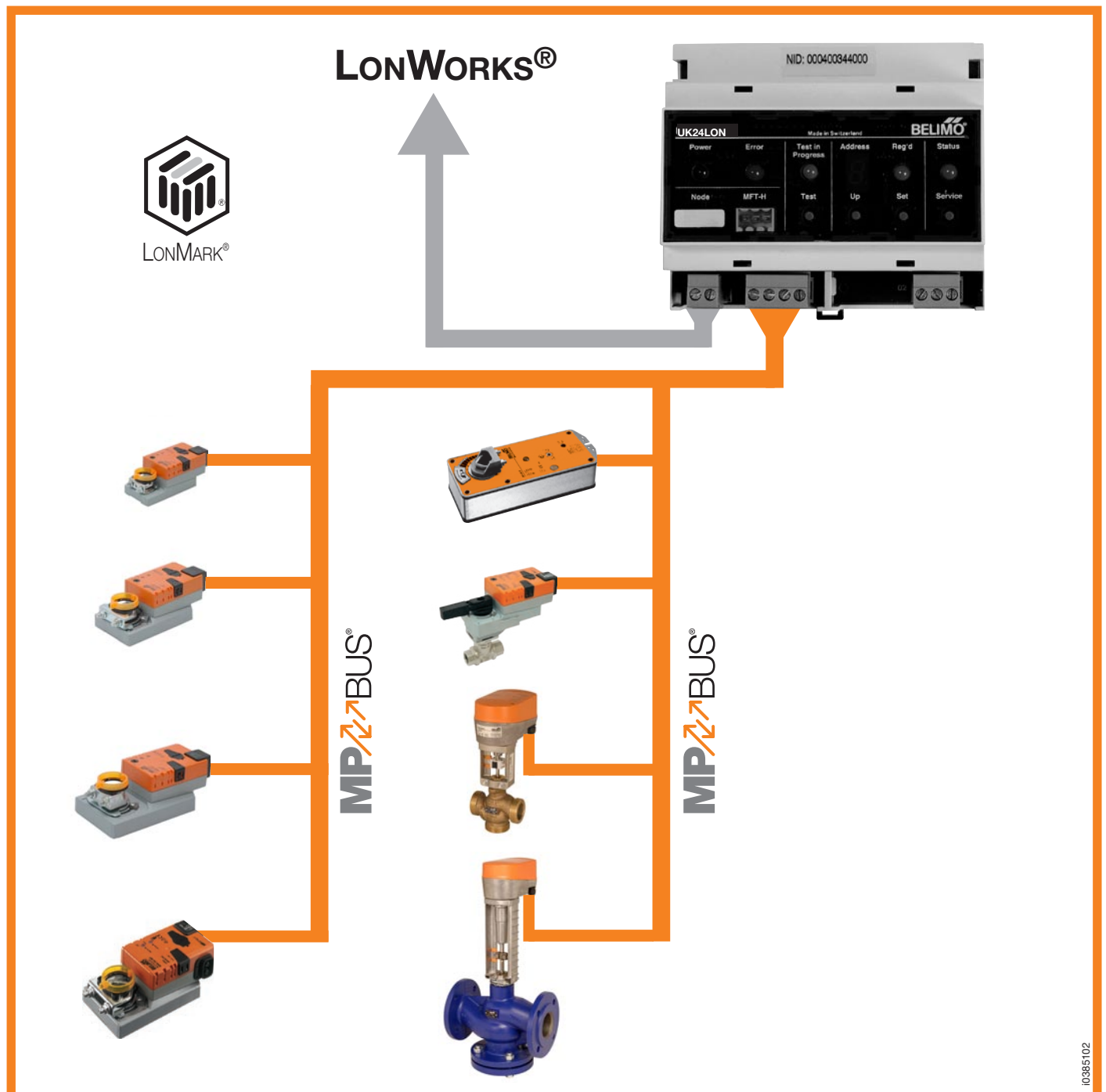


2. + 4. + 5. + 6. UK-4

Product Information

UK24LON Gateway MP/LonWorks®

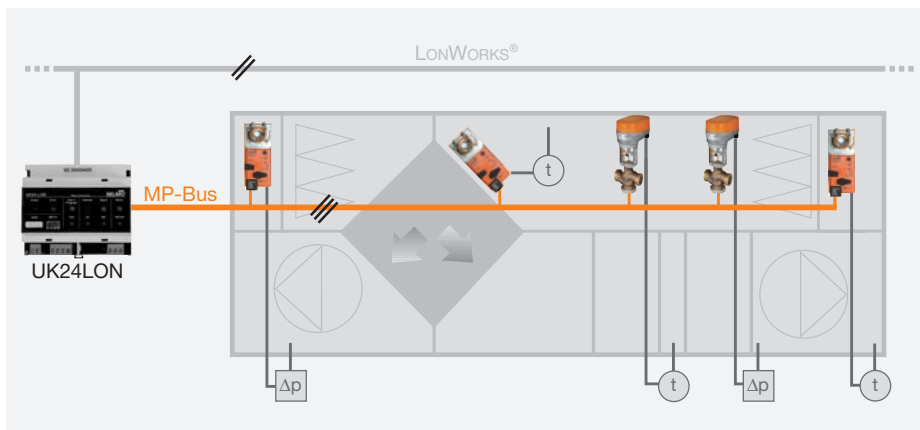
UK24LON



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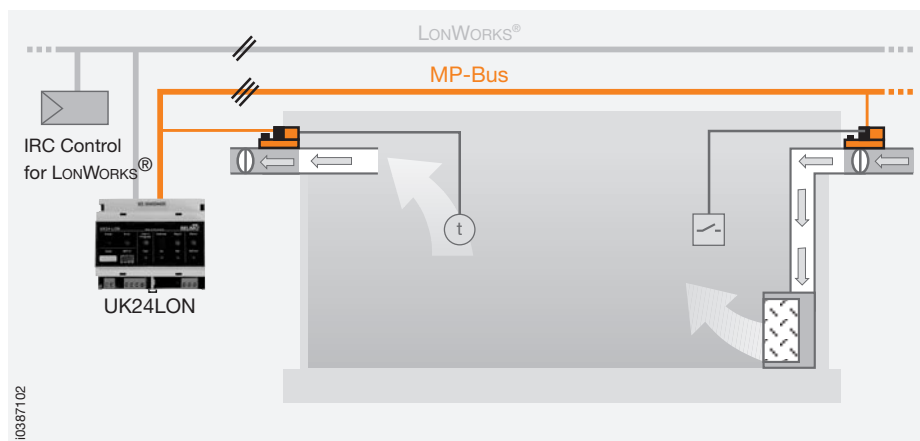


Example 1: Connecting the actuators and sensors in the plant room of a central ventilation system to LONWORKS® via a UK24LON unit



The plant room of a central ventilation system employing Belimo MFT(2)/MP actuators (for air dampers and valves) can be bus-linked to LONWORKS®. A UK24LON unit (MP/LON Gateway) is used to link the MP-Bus-capable actuators and the sensors that are connected to them to the LONWORKS® system.

Example 2: VAV-Control with a link to LONWORKS®



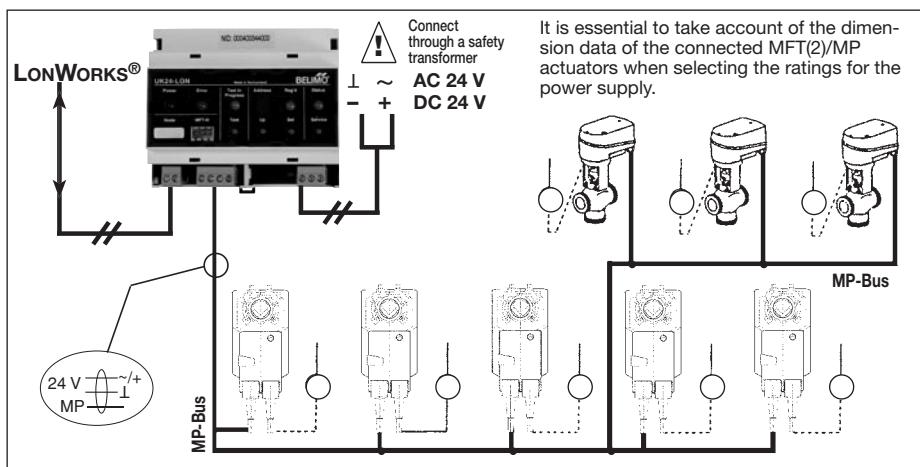
VAV air volume controllers for supply air and exhaust air employing VAV-Compact (LMV-D2-MP, NMV-D2-MP or SMV-D2-MP) motorised actuators can be linked together via an MP-Bus.

The VAV devices and the sensors connected to them (presence and temperature sensors) are linked to LONWORKS® through a UK24LON unit (MP/LON Gateway). The UK24LON provides the actuator functions and sensor values to the LONWORKS® network via standardised network variables (SNVT). The actuator functions and sensor values can be linked via the SNVTs to the IRC individual room controller, which takes on the control tasks for the individual room.

□ ○ Various sensors

≡ Power supply and communication via 3 conductors only

≡ Communication via 2 conductors



Technical data	UK24LON unit
Power supply	AC 24 V 50/60 Hz, DC 24 V
Functional range	AC 19.2...28.8 V, DC 21.6...28.8 V
For wire sizing	3 VA (without MFT(2)/MP actuators connected)
Power consumption	1.5 W
Connections	LONWORKS®: push-screw terminals, 2-pole Power: push-screw terminals, 3-pole MFT(2)/MP-actuators: push-screw terminals, 4-pole (all terminals for 1,5 mm²) MFT-H: plug socket, 3-pole (for MFT parameterising tools)
Processor/Memory	Neuron 3150®; 10 MHz; 48 kB flash memory, 8 kB RAM
Transceiver	FTT-10A compatible with LPT-10
Functional Profile	Damper Actuator 8110; see page 8 For further detailed information refer to the LONMARK® web site (www.lonmark.org)
LNS-Plug-In (configuration software)	The following are available for LonMaker 2.0: Modifiable – MFT(2)/MP actuator addresses with Plug-In: – Min./Max. limits – Definition of sensors connected to the MFT(2)/MP actuators
Communication with MFT(2)/MP actuators	Belimo-MP-Bus: Master-Slave system 1200 Baud
No of MFT(2)/MP actuators	up to 8 actuators can be connected
Maximum MP conductor length	Depends on the number of MFT(2)/MP actuators connected, types of actuators, type of power supply and crosssectional area of the conductor. Refer to the diagram on page 7
LONWORKS® conductor lengths and transmission media	In accordance with Echelon recommendations
Ambient temp. range	0°C...+50°C
Protection class	⚡ (safety extra-low voltage)
Degree of protection	IP20
EMC	CE in accordance with 89/336/EU, 92/31/EU, 93/68/EU
Mounting	DIN rail 35 mm
Weight	ca. 500 g

Gateway MP to LONWORKS®

- MP/LON interface
- MFT(2)/MP actuators (with MP communications capability) linked to LONWORKS® through a UK24LON unit
- Up to 8 actuators can be connected
- LONMARK® certified

Application

The UK24LON unit is a Belimo gateway that has been certified by LONMARK®. It allows the Belimo MP-Bus to be linked to LONWORKS®.

Up to 8 MP capable actuators can be connected to the MP-Bus side of the system (damper actuators, valve actuators and VAV-Compact).

Mode of operation

Through the UK24LON unit the actuators can be controlled digitally over the MP-Bus and they also provide feedback of their current operating status. In the UK24LON unit the digital data for control and feedback is converted to standard network variables (SNVT's). This allows the functions of the actuators to be linked directly to LONWORKS®.

Sensor connection

One sensor can be connected to each MFT2 actuator. It can be either a passive resistance-type sensor (Pt1000, Ni1000 or NTC), an active sensor (e.g. with a DC 0...10 V output) or a switching contact. This provides a simple means of digitising the analogue signal from the sensor through the actuator so that it can be passed on to LONWORKS® via the UK24LON unit.

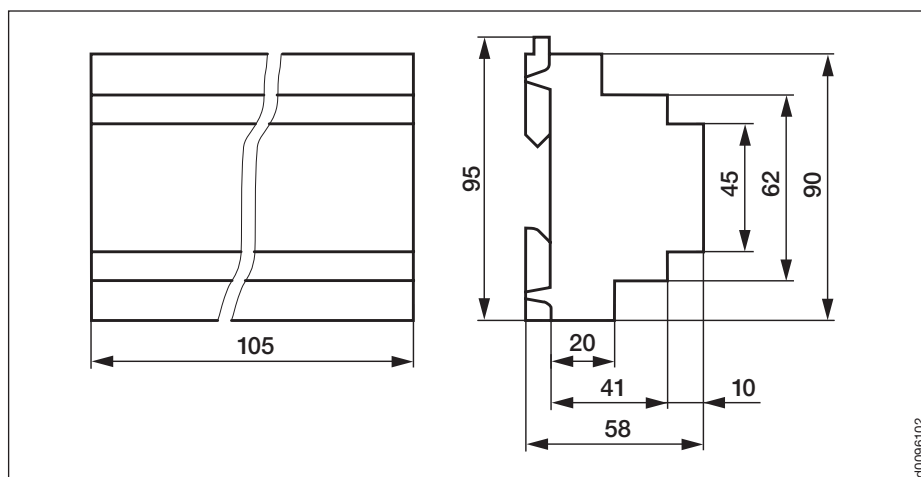
Parameterising MFT(2)/MP actuators

Using the Belimo PC-Tool it is very easy to preset specific parameters (e.g. running time) for individual actuators. An MFT parameterising tool can be connected to the 3-pole plug socket of the UK24LON unit.

Important installation note!

Do not energise the system (UK24LON and actuators) until all the wiring has been finished.

UK24LON unit dimensions



Complete MFT(2)/MP assortment for connection to the UK24LON



Damper actuators with or without safety function



MP-VAV devices



Actuators for characterised control ball valves with or without spring-return function

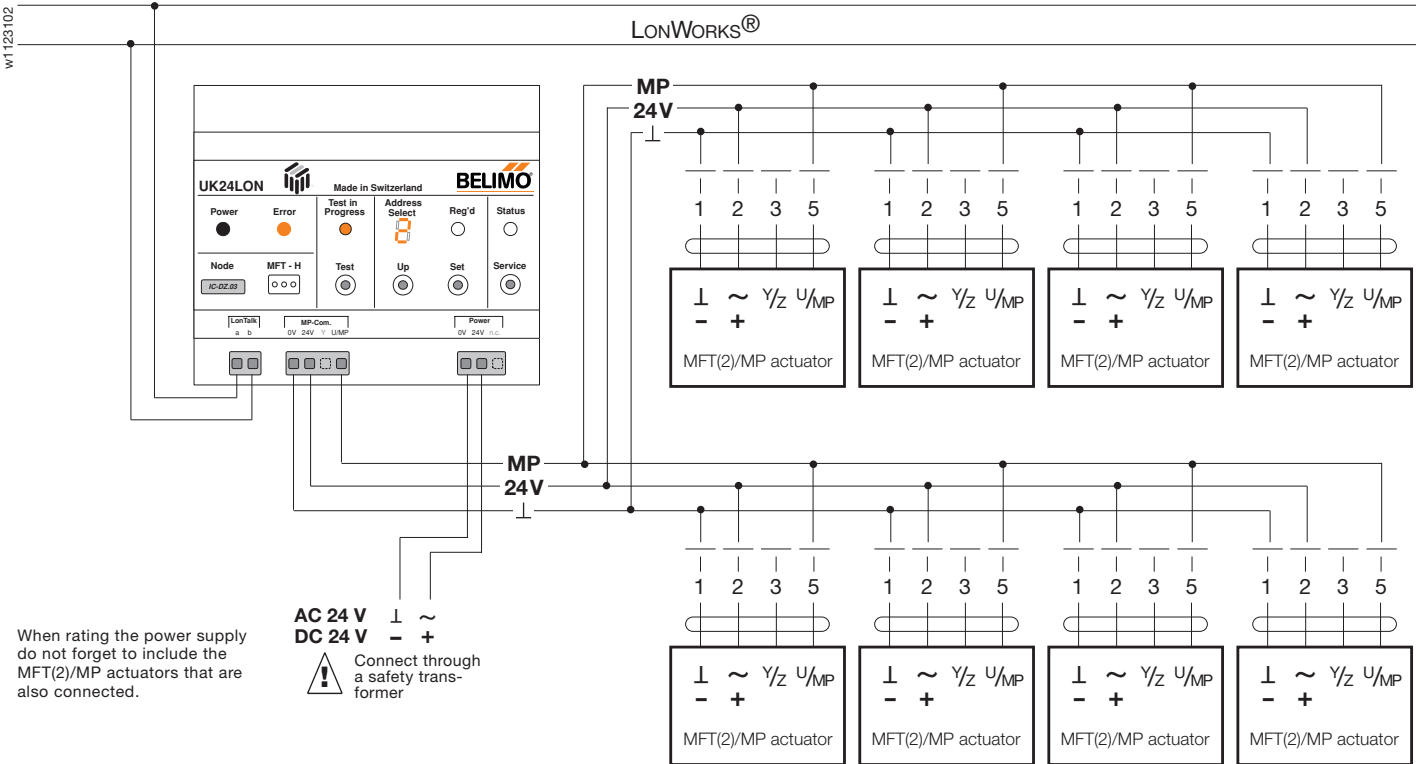


Actuators for globe valves with or without spring-return function



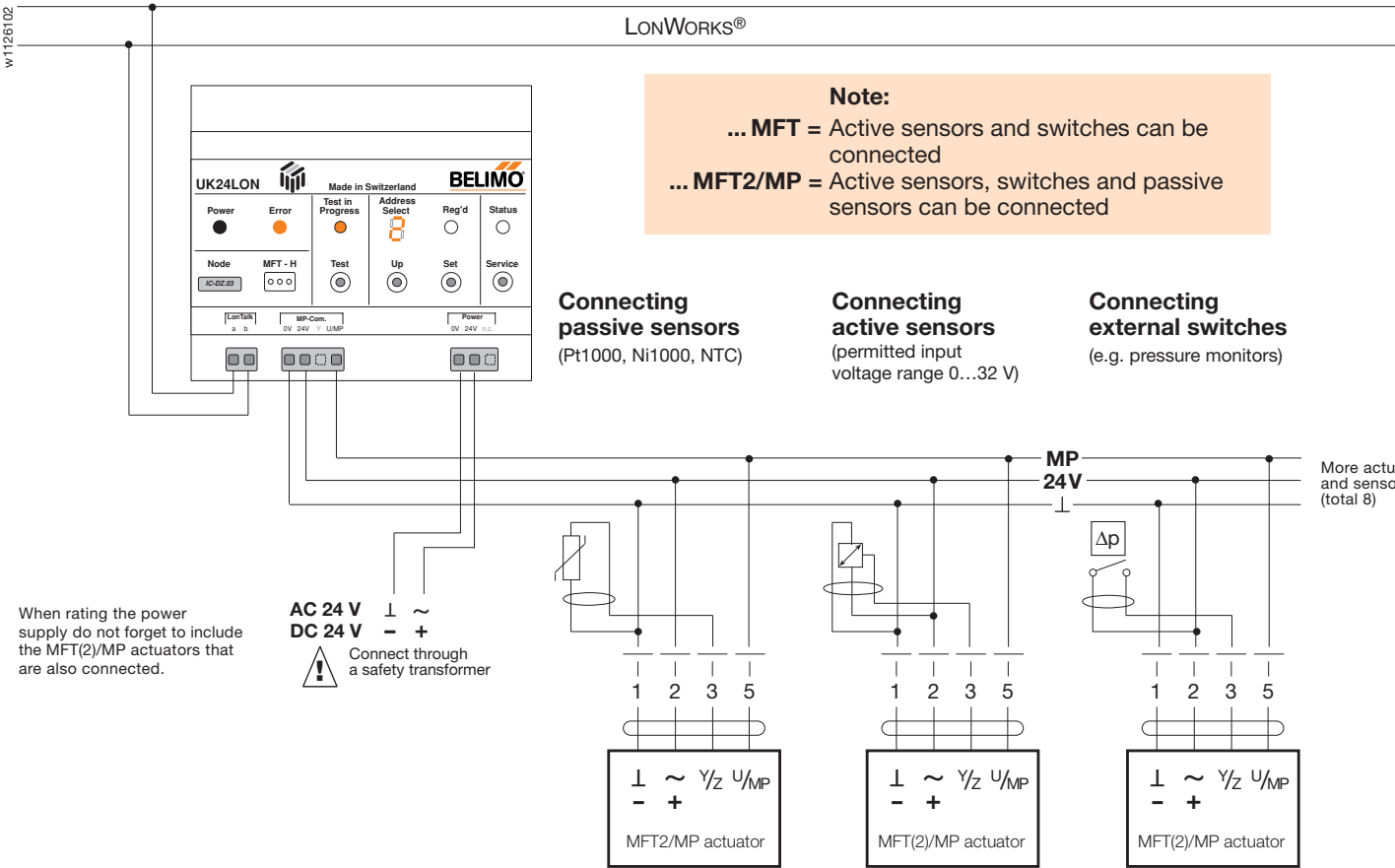
Actuators for butterfly valves

Connecting MFT(2)/MP actuators



Connecting sensors

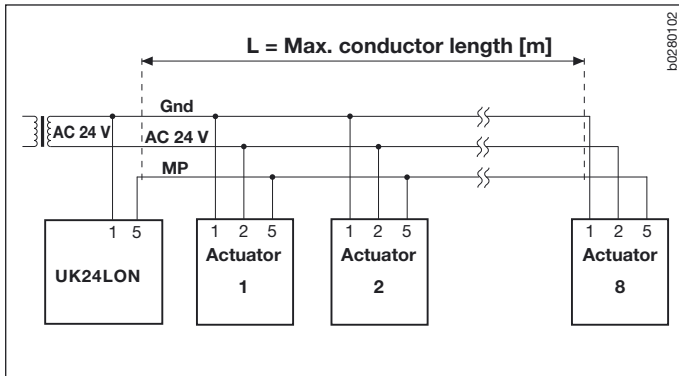
One sensor can be connected to each MFT(2)/MP actuator. It can be either a passive resistance-type sensor (e.g. Pt1000, Ni1000 or NTC), an active sensor (e.g. with a DC 0...10 V output) or a switching contact. This provides a simple means of digitising the analogue signal from the sensor through the actuator so that it can be passed on to LONWORKS® via the UK24LON unit.



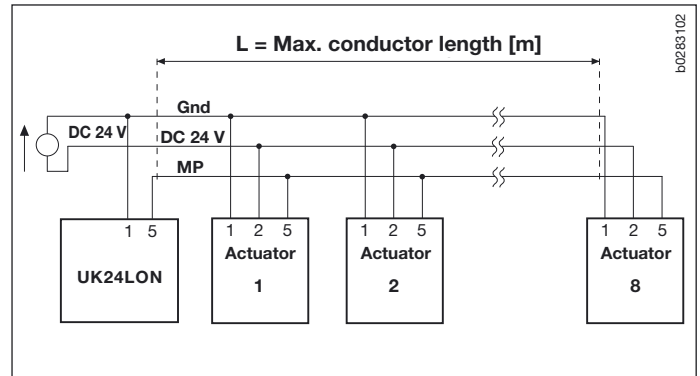
Connecting the MP-Bus

- The network employs a 3-pole connection (MP communication and 24 V power supply).
- Up to 8 MFT(2)/MP actuators can be connected to each network.
- No special cable or terminating resistors are needed.
- Conductor lengths are limited (see below for methods of calculation)
 - by the total power rating of the MFT(2)/MP actuators that are connected,
 - by the type of power supply (AC 24 V or DC 24 V via the bus),
 - by the cross sectional area of the conductor.

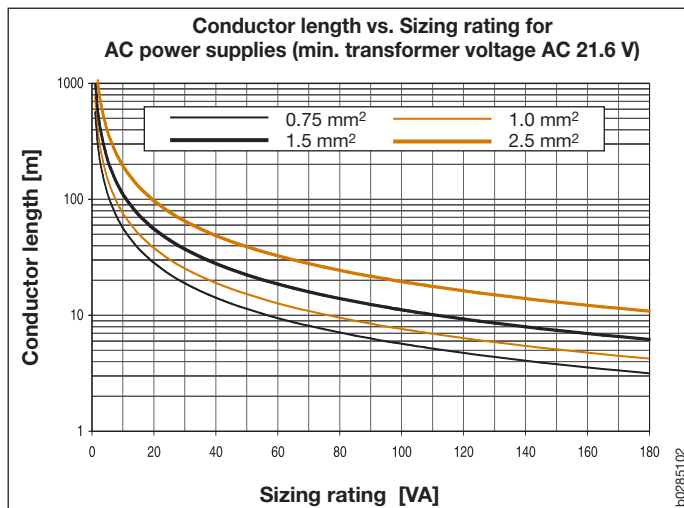
Maximum conductor length for AC 24 V



Maximum conductor length for DC 24 V



Total power rating of MFT(2)/MP actuators [VA]



! In the case of the NVF24-MFT2 the sizing rating must be multiplied by 2.

Calculating maximum conductor lengths

First add together the power ratings [VA] of the MFT(2)/MP actuators that are being used and then read off the corresponding conductor lengths from the diagram.

Example:

Connected to the MP-Bus are: 1 pce NM24A-MP, 1 pce SM24A-MP, 1 pce LMV-D2-MP... and 1 pce NV24-MFT2

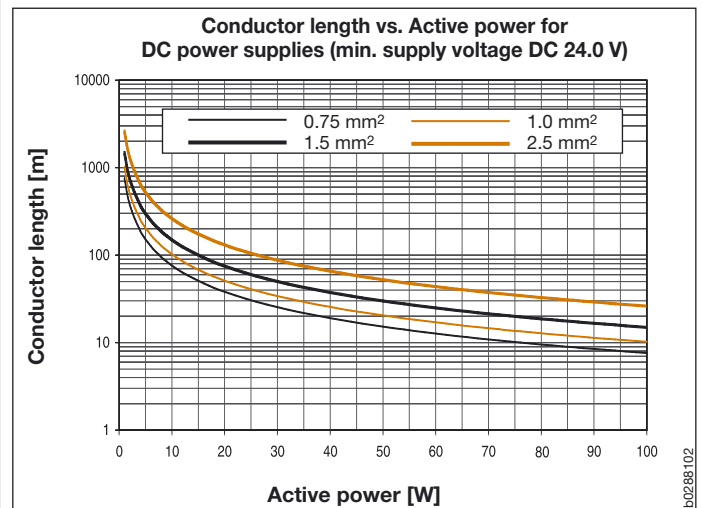
Total power rating:

$$5.5 \text{ VA} + 6 \text{ VA} + 5 \text{ VA} + 5 \text{ VA} = 21.5 \text{ VA}$$

Read off from the curves:

- Cable with core Ø 0.75 mm² gives: **cable length 28 m**
- Cable with core Ø 1.0 mm² gives: **cable length 35 m**
- Cable with core Ø 1.5 mm² gives: **cable length 50 m**
- Cable with core Ø 2.5 mm² gives: **cable length 90 m**

Total power rating of MFT(2)/MP actuators [W]



Conductor length vs. Active power for DC power supplies (min. supply voltage DC 24 V).

Calculating maximum conductor lengths

First add together the power ratings [W] of the MFT(2)/MP actuators that are being used and then read off the corresponding conductor lengths from the diagram.

Example:

Connected to the MP-Bus are: 1 pce NM24A-MP, 1 pce SM24A-MP, 1 pce LMV-D2-MP... and 1 pce NV24-MFT2

Total power rating:

$$3.5 \text{ W} + 4 \text{ W} + 3 \text{ W} + 3 \text{ W} = 13.5 \text{ W}$$

Read off from the curves:

- Cable with core Ø 0.75 mm² gives: **cable length 55 m**
- Cable with core Ø 1.0 mm² gives: **cable length 75 m**
- Cable with core Ø 1.5 mm² gives: **cable length 110 m**
- Cable with core Ø 2.5 mm² gives: **cable length 190 m**

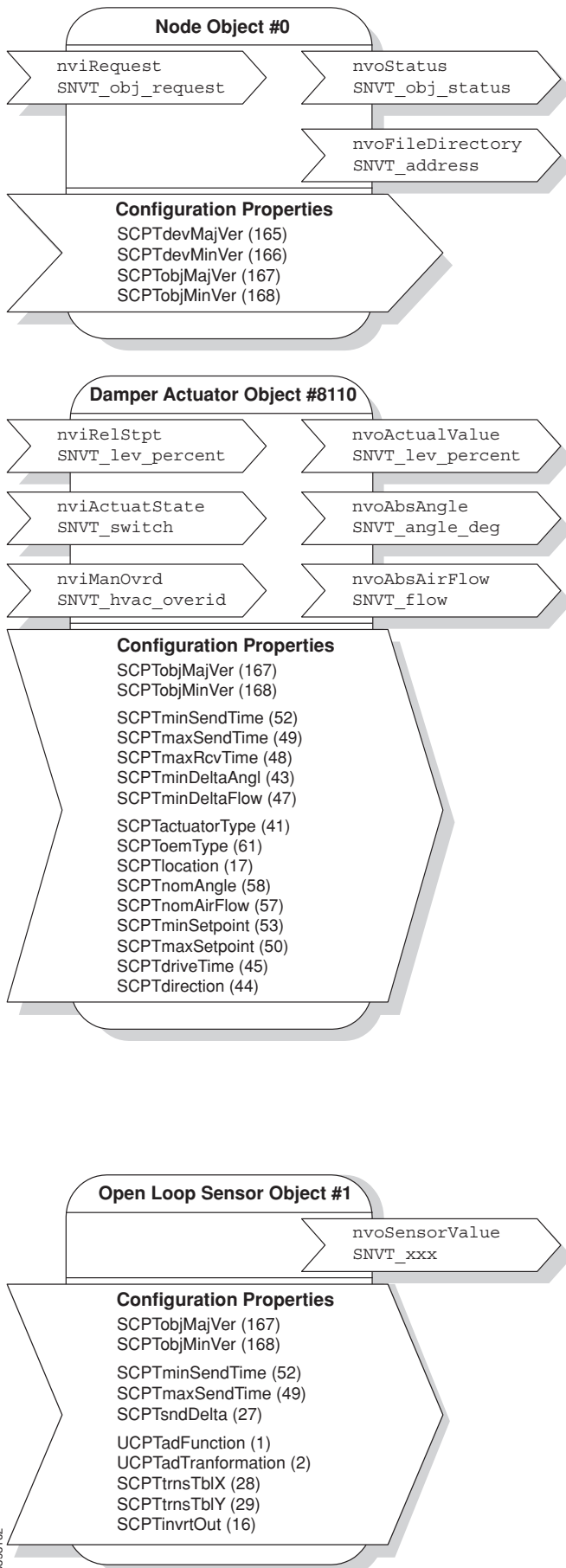
Maximum conductor length with a local AC 24 V power supply (vor Ort)

Note: If the actuators are fed with a local AC 24 V power supply from a separate transformer it is possible for conductor lengths to be substantially greater. Regardless of the power ratings of the actuators connected to the UK24LON unit the conductor lengths are then as stated in the adjacent table.

Core Ø mm²	L = Max. conductor length [m]
0.75	800
1.0	
1.5	
2.5	

LONMARK® Functional Profile

The UK24LON unit can link a maximum of 8 MFT(2)/MP actuators with an MP-Bus capability to LONWORKS®. The UK24LON Gateway converts the digital communications processes of the MP-Bus to standard LONMARK® network variables.



Node Object #0

Node Object contains the functions Object Status/Object Request.

nviRequest

SNVT_obj_request

Input variable, demands the status of a specific object in the node.

nvoStatus

SNVT_obj_status

Output variable, gives the actual status of a specific object in the node.

nvoFileDirectory

SNVT_address

Output variable, indicates information in the address area of the Neuron chip.

Damper Actuator Object #8110

The actuator object shows the functions of the MFT2 actuators on the LONWORKS® network side. The UK24LON unit implements 8 of these objects (one for each MFT(2)/MP actuator, see next page).

nviRelStpt

SNVT_lev_percent

This input variable gives the actuator its reference position or set-point. The variable is normally linked to the output variable of an HVAC controller.

nviActuateState

SNVT_switch

This input variable gives the actuator a preset position. Note on priority: whichever variable, nviActuatState or nviRelStpt, was last active takes priority.

nviManOvr

SNVT_hvac_overid

These input variables can be used to manually override the actuator into a particular position. If the manual override (nviManOvr) is in HVO_OFF status, the network variables nviRelStpt or nviActuatState are active. The table defined in the functional profile (#8110) applies to the other statuses.

nviManOvr

SNVT_hvac_overid

This input variable allows manual overriding of the actuator to a specific position (the function is only active if preceded by RQ_OVERRIDE). The function is typically used during the commissioning of installations.

nvoActualValue

SNVT_lev_percent

This output variable shows the actual position of the actuator and can be used for resetting control circuits or for indicating position.

nvoAbsAngle

SNVT_angle_deg

This output variable shows the actual angle of rotation of the actuator or damper blade and can be used for indicating position or for servicing purposes (not for the NMV-D2M or linear actuators).

nvoAbsAirFlow

SNVT_flow

This output variable shows the actual volumetric flow through the appropriate box and can be used for control and indicating purposes (MP-VAV only).

Open Loop Sensor Object #1

One sensor can be connected to each MFT(2)/MP actuator. It can be either a passive resistance-type sensor (Pt1000, Ni1000 or NTC), an active sensor (e.g. with a DC 0...10 V output) or a switching contact. The measured sensor values are transferred to the LONWORKS® network by the Open Loop Sensor Object. This object is implemented 8 times in the UK24LON unit (see next p.9).

nvoSensorValue

SNVT_XXX

This output variable shows the actual sensor value. Depending on the connected sensor, the output variable can be configured via the sensor plug-in and specifically adapted to the system.

The SNVT_XXX can be configured as follows:

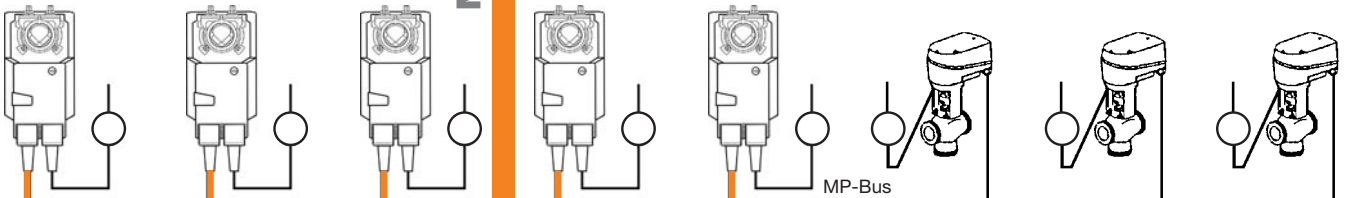
SNVT_temp_p	SNVT_lev_percent	SNVT_lux
SNVT_temp	SNVT_abs_humidity	SNVT_press_p
SNVT_switch	SNVT_enthalpy	SNVT_smo_obscur
SNVT_flow	SNVT_ppm	SNVT_power
SNVT_flow_p	SNVT_rpm	SNVT_elec_kwh

Functional Profile for 8 MFT(2)/MP damper actuators and 8 sensors implemented in a UK24LON unit

UK24LON



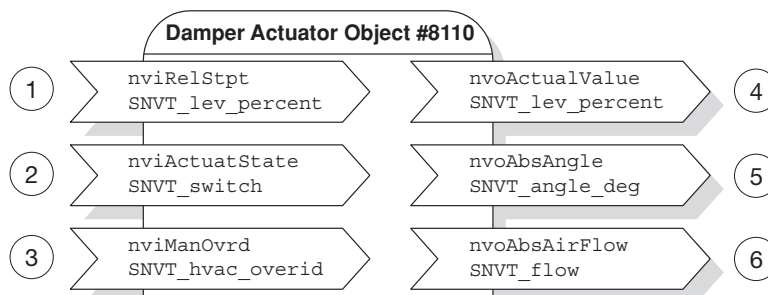
MP-BUS



Explanation of SNVT functions of the function objects

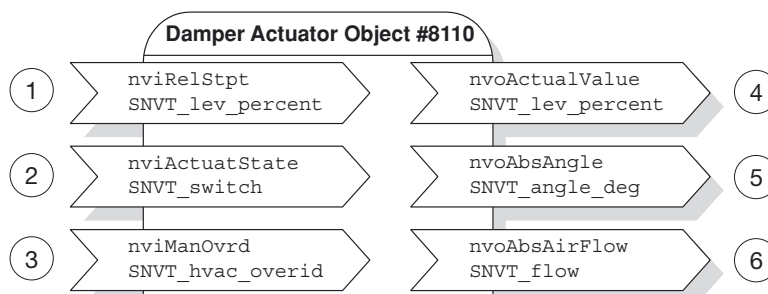
An MFT(2)/MP damper actuator or characterised control valve actuator is connected to the UK24LON:

- ① **nviRelStpt:** Setpoint for actuator position (0...100% angle of rotation).
- ② **nviActuatState:** Setpoint of the damper position in accordance with the selected position (detailed functions visible in LONMARK® functional profile #8110, see www.lonmark.org).
- ③ **nviManOvr:** Input for manual override (detailed functions visible in LONMARK® functional profile #8110, see www.lonmark.org).
- ④ **nvoActualValue:** Actual value for actuator position (0...100% angle of rotation).
- ⑤ **nvoAbsAngle:** Displays the absolute actual value of the actuator position in degrees of angle (°).
- ⑥ **nvoAbsAirFlow:** SNVT displays a constant value of 65535 for a damper actuator; this is invalid.



An MFT(2)/MP globe valve actuator is connected to the UK24LON:

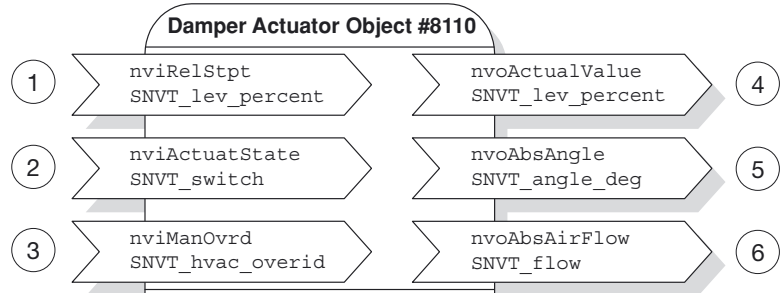
- ① **nviRelStpt:** Setpoint for actuator position (0...100% stroke).
- ② **nviActuatState:** Setpoint of the stroke in accordance with the selected position (detailed functions visible in LONMARK® functional profile # 8110, see www.lonmark.org).
- ③ **nviManOvr:** Input for manual override (detailed functions visible in LONMARK® functional profile # 8110, see www.lonmark.org).
- ④ **nvoActualValue:** Actual value for actuator position (0...100% stroke).
- ⑤ **nvoAbsAngle:** SNVT displays a constant value of 655.34 for a valve actuator; this is invalid.
- ⑥ **nvoAbsAirFlow:** SNVT displays a constant value of 65535 for a valve actuator; this is invalid.



Explanation of SNVT functions of the function objects

A VAV-MP device is connected to the UK24LON:

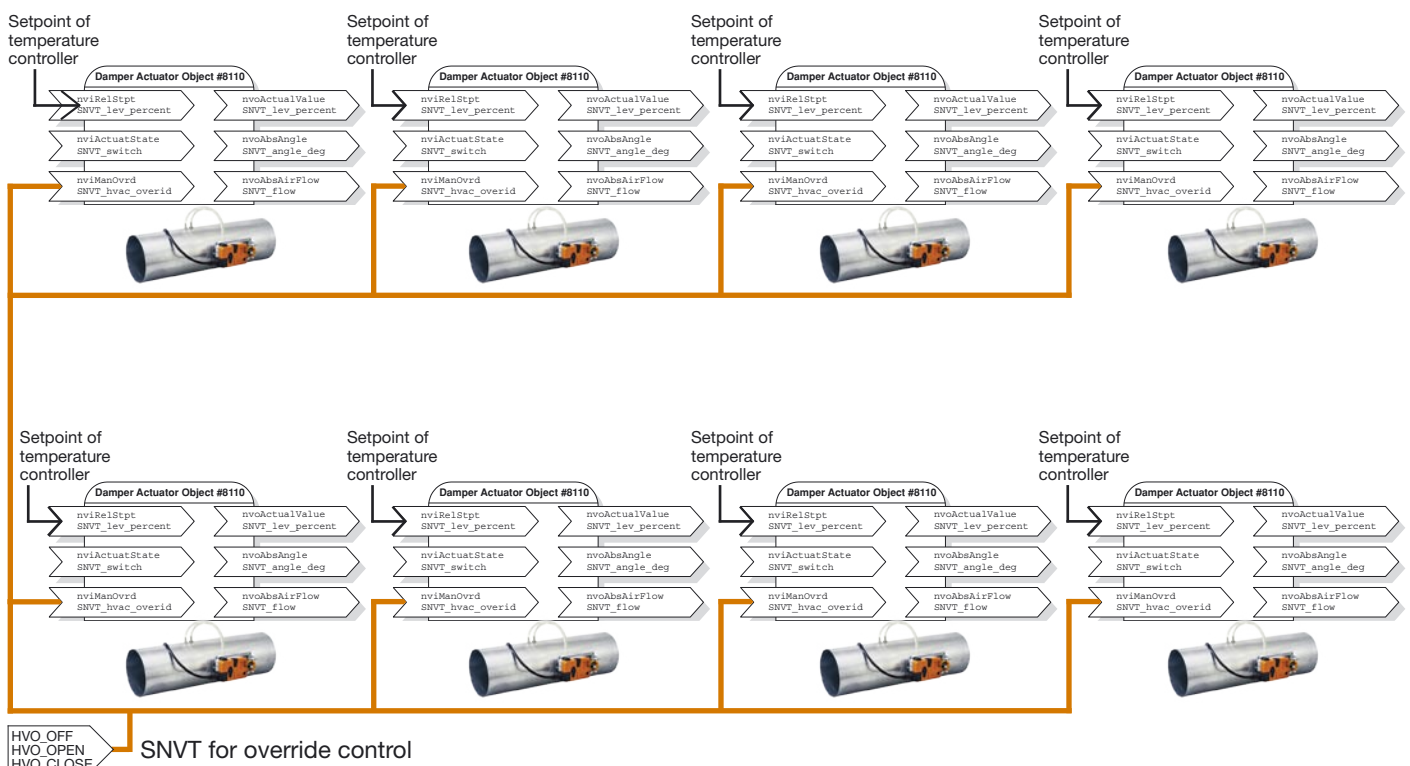
- ① **nviRelStpt:** Setpoint for VAV controller of the VAV unit (0...100% nominal volumetric flow of the VAV unit).
- ② **nviActuatState:** Setpoint of the volumetric flow in accordance with the selected position (detailed functions visible in LONMARK® functional profile # 8110, see www.lonmark.org).
- ③ **nviManOvrd:** Input for manual override (detailed functions visible in LONMARK® functional profile # 8110, see www.lonmark.org).
- ④ **nvoActualValue:** Actual value of volumetric flow (0...100% nominal volumetric flow of the VAV unit).
- ⑤ **nvoAbsAngle:** Displays the current actuator position or damper position [angle of rotation in degrees of angle (°)].
- ⑥ **nvoAbsAirFlow:** Displays the current volumetric flow in l/s.



Example of override control with the SNVT nviManOvrd in VAV controllers

Functions:

- **HVO_OFF:** Temperature controller setpoints are active
- **HVO_OPEN:** All VAV units are fully open (e.g. flushing operation or night cooling)
- **HVO_CLOSE:** All VAV units are fully closed (system closed when the air conditioning system is switched off)



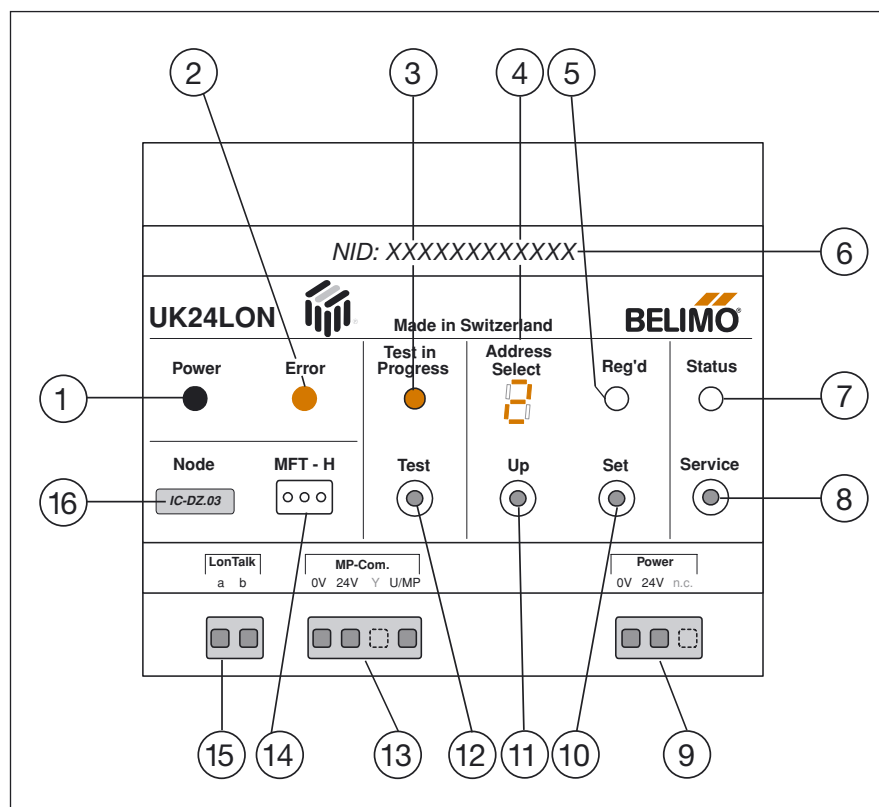
Legend for operating controls

- ① Power LED
- ② Error LED
- ③ Test in progress LED
- ④ MP address display
- ⑤ Registered actuator LED
- ⑥ Individual Neuron ID
- ⑦ Status LED function according to Echelon Guidelines
- ⑧ Service button for commissioning with LONWORKS®
- ⑨ Unit power supply AC or DC 24 V
- ⑩ SET button for MP addressing
- ⑪ Up button for MP addresses
- ⑫ Start test button
- ⑬ MP connector: For connecting MFT(2)/MP actuators
- ⑭ MFT-H connector: For connecting the MFT parameterising tool
- ⑮ LONWORKS® connector
- ⑯ Node label

The operating controls numbered

② ③ ④ ⑤ ⑦ ⑩ ⑪ ⑫

are described below in greater detail.



Operation, characteristics of the UK24LON unit

Automatic scanning of the MP network

As soon as the UK24LON unit is powered up it starts scanning the MP network automatically. All eight MP addresses are interrogated cyclically to see whether there is an actuator available to respond. The results are compared against a reference table stored in the UK24LON unit. If an actuator responds from an MP address that is not assigned in the reference table it is automatically inserted into the table. If an actuator already assigned in the reference table fails to respond an error alarm is initiated but the reference table is not altered in any way. The actuators can be pre-addressed so that they are recognised automatically when they are connected to the MP network.

Manual addressing of actuators

- All required actuators must be connected first.
- Use the **Up** button (⑪) to select the address to be issued. The actual address will be shown on the display (④).
- Use the **Set** button (⑩) to start the addressing process (hold for at least 2 seconds). The **Reg'd** LED (⑤) starts flashing slowly (at 1/2 second intervals) to indicate that the process is in progress.

- Within the next 10 minutes, the MFT(2)/MP actuator being addressed must be reset (in the case of standard damper actuators by pressing the addressing button; in the case of spring return actuators by moving the L/R switch back and forth and in the case of globe valve actuators by pressing the S2 button). The UK24LON unit will then be able to recognise and address the actuator. This status is indicated by fast flashing of the **Reg'd** LED (⑤).
- As soon as addressing of the actuator has been completed the **Reg'd** LED (⑤) gives a steady light. This also indicates that the MP address has been successfully stored in the reference table of the UK24LON unit.

Notes on addressing

- If none of the actuators has been reset within 10 minutes of the addressing process being initiated, the process will be discontinued. The reference table remains unchanged and the **Reg'd** LED - (⑤) stops flashing.
- If an address is issued that has already been assigned to another actuator the latter is automatically de-addressed first before the new actuator is addressed.
- If a mistake is made in initiating addressing, the process can be stopped by briefly pressing the **Set** button (⑩).

- Normal data traffic on the MP network is interrupted while addressing is in progress.

Manual de-addressing of MFT(2)/MP actuators

- All actuators that are to be de-addressed must be connected first.
- Press the **Up** button (⑪) to select the address to be deleted. The current address is shown on the display (④).
- Start de-addressing by pressing the **Set** button (⑩) (min. 2 s). The **Reg'd** LED (⑤) flashes slowly as a check (every 1/2 second).
- Press the **Set** button (⑩) a second time until the **Reg'd** LED (⑤) flashes rapidly.
- The **Reg'd** LED (⑤) goes out after the actuator has been de-addressed, i.e. removed from the reference table and set to the address "PP".

Notes on de-addressing

- If, after de-addressing has been initiated, the **Set** button (10) is not pressed a second time, the de-addressing process will be discontinued. The reference table remains unchanged and the **Reg'd** LED (5) stops flashing.
- If there is no actuator connected, only the entry in the reference table of the UK24LON unit will be deleted. It will be registered again when the actuator is reconnected.
- If a mistake is made in initiating de-addressing, the process can be stopped by pressing the **Set** button (10).
- Normal data traffic on the MP network is interrupted while de-addressing is in progress.

Testing the MFT(2)/MP actuators

- Use the **Up** button (11) to select the address to be tested. The actual address will be shown on the display.
- Now start the test with the **Test** button (12). The **Test in progress** LED (3) gives a steady light to indicate that the process is in progress. The actuator opens fully and then closes fully.
- When the test has been completed the **Test in progress** LED (3) goes out and the actuator returns to its last reference position.

Notes on testing

- If a mistake is made in initiating testing, the process cannot be stopped.

Normal data traffic with the other actuators on the MP network is continued while testing is in progress.

- **Note:** By holding the button depressed for more than 2 seconds all addressed and responding actuators can be tested simultaneously.
- No mechanical testing of actuators can be initiated at addresses that have either not been registered or are incorrect.

Automatic standby mode (darkening of the display)

The displays and operating controls of the UK24LON unit are deactivated automatically when they are not being used in order to save energy and to avoid accidental (mal-)operation.

Automatic deactivation occurs approximately 2 minutes after the last time an operating control is used provided there is no mechanical testing or addressing in progress and no errors are being displayed. The unit can be reactivated by pressing the **Up** button (11) (for at least 2 s). It will not be possible to perform a mechanical actuator test or addressing/de-addressing until this has been done.

Error displays

1. Permanently lit LED

The UK24LON unit can detect communications faults on the MP network. They are indicated by the **Error** LED (2) lighting up and the appropriate address being displayed. If more than one address is af-

ected the lowest one will be displayed. The display can then be scrolled with the **Up** button (11).

The UK24LON unit cannot change to standby mode as long as an error is being displayed.

2. Flashing LED

A flashing LED **Error** (2) and simultaneous display of the MP addresses indicates a mechanical fault of the corresponding MFT(2)MP actuator. (The fault can be diagnosed with the PC-Tool).

The flashing **Error** LED means that the MP communication between UK24LON and the corresponding actuator is OK.

LON status display

The **Status** LED (7) behaves as indicated in the Echelon Guidelines:

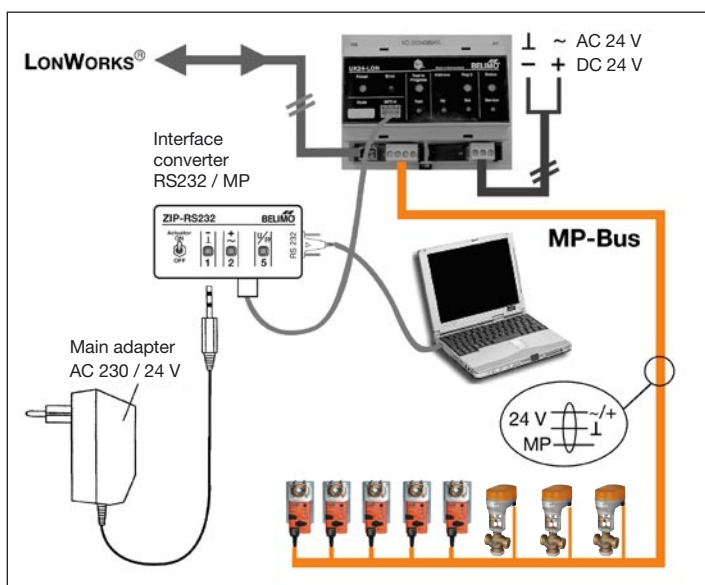
- **Dark:**
The UK24LON unit is ready for service and connected to the LONWORKS® network.
- **Flashing at 2-second intervals:**
The UK24LON unit is ready for service but not connected to the LONWORKS® network.
- **Steady light:**
The UK24LON unit has not been loaded with application software.
- **Other flashing:**
There is a fault in the UK24LON unit.

Connecting parameterising tools for the MFT(2)/MP actuators

(A ZIP interface USB/MP is also available)

Using the Belimo PC-Tool or the MFT-H manual parameterising device it is very easy to preset specific parameters (e.g. running time) for individual actuators. The MFT-H or the PC (PC via ZIP-RS232 interface) can be connected to the 3-pole

plug socket of the UK24LON unit to obtain direct access to the appropriate actuator. During access the UK24LON unit signals that communication between MFT-H or PC-Tool and actuator is in progress by means of a letter H on the display (4).



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