



Operating instructions
Control unit for RGBW LED strips
DP1615

GB

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1 Preliminary note

You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at documentation.ifm.com.

1.1 Symbols used

- ✓ Requirement
- Instructions
- ▷ Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  Information
Supplementary note

1.2 Warnings

Warnings indicate the possibility of personal injury and damage to property. This enables safe product handling. Warnings are graded as follows:



WARNING

Warning of serious personal injury

- ▷ If the warning is not observed, fatal and serious injuries are possible.



CAUTION

Warning of minor to moderate personal injury

- ▷ If the warning is not observed, minor to moderate injuries are possible.

ATTENTION

Warning of damage to property

- ▷ If the warning is not observed, damage to property is possible.

1.3 Safety symbol on the device



Safety symbol on the device:

- Adhere to the operating instructions for the safe operation of the unit.

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
 - The system architect is responsible for the safety of the system.
 - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, programming, configuration, operation and maintenance of the product must be carried out by personnel qualified and authorised for the respective activity.
- Protect units and cables against damage.
- Replace damaged units, otherwise the technical data and safety will be impaired.
- Observe applicable documents.

3 Intended use

The device is used to control RGB and RGBW LED strips without an integrated controller. The colour, intensity and appearance of the LED strips can be adjusted. The device can only be configured via IO-Link. It is designed for operation as a standard IO device and as an IO-Link device.



The unit is not suited for environments with particular requirements on mechanical stability (e.g. shock/vibration).

The unit is intended for indoor use only.

► Observe the operating conditions (→ Technical data at www.ifm.com).

4 Function

The device can be operated as a standard IO and IO-Link device and provides process data via IO-Link as an IO-Link device.

The following options are available via IO-Link:

- Remote parameter setting: reading and changing the current parameter setting
- IO-Link parameter setting: [IO Device Description \(IODD\)](#) (→ [7](#))

4.1 Application example

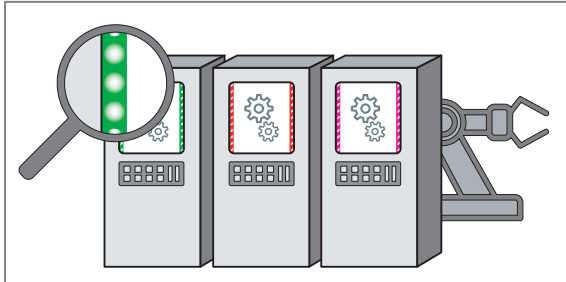


Fig. 1: Application example: Indication of machine operating states

LED strips for operating status indication, LED strip control via DP1615

Operating states:

- green → OK
- amber → maintenance required
- red → failure

4.2 Application as an IO-Link device

4.2.1 General information

The unit has an IO-Link communication interface which requires an IO-Link capable module (IO-Link master).

The IO-Link interface allows direct access to the process and diagnostic data and enables setting of the parameters of the unit during operation.

You will find further information about IO-Link and all the necessary information about the required IO-Link hardware and software at:

www.io-link.ifm

4.2.2 Application example

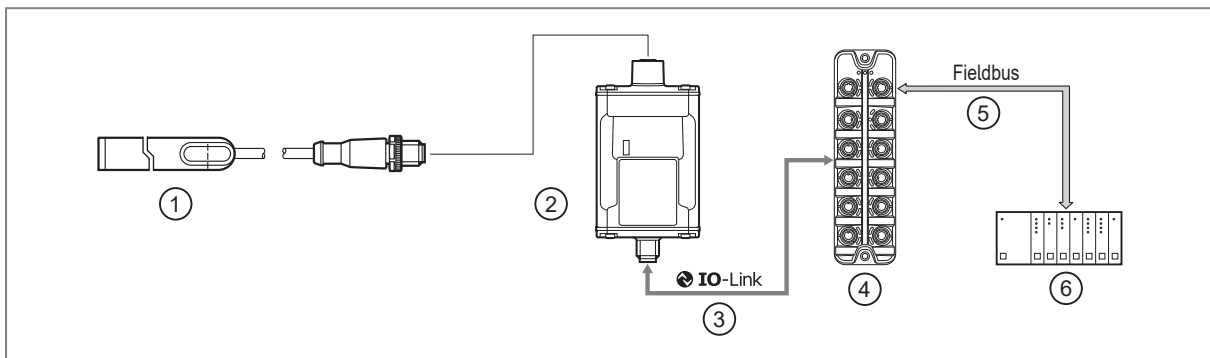


Fig. 2: Application example with IO-Link master

- | | |
|--|-------------------------------------|
| 1: LED strip | 2: Control unit for RGBW LED strips |
| 3: Fully bidirectional IO-Link communication
- remote parameter setting: reading and changing the parameter setting | 4: IO-Link master |
| 5: Fieldbus (e.g. Profibus, Profinet, AS-i, etc.) | 6: PLC |

4.2.3 IO Device Description (IODD)

You will find the IODDs required for configuration of the IO-Link device as well as detailed information about the process data structure, diagnostic information and parameter addresses at documentation.ifm.com

4.3 Use as a standard IO device

As a standard IO device, the device has three digital inputs. By triggering the inputs accordingly, the connected LED strip can light in three different colour variations, e.g. to indicate the state of a machine. For the digital inputs, the priorities are taken into account.

4.4 Operating modes

The device has two operating modes:

- ON/OFF mode
- RGB mode

The operating mode is set with the [ModE] parameter.

4.4.1 ON/OFF mode

In ON/OFF mode, there are three priority levels available. Using acyclic IO-Link parameter setting, each priority can be assigned a colour, intensity and appearance.

- Setting-A: high priority
- Setting-B: medium priority
- Setting-C: low priority

The connected LED lights according to the highest activated priority. Any lower activated priority is ignored.

Priorities are activated as follows depending on the application:

- Operation as a standard IO device: activation via the digital inputs of the device
[Electrical connection](#) (→ [11](#))
- Operation as an IO-Link device: activation via 3 bits in the process data

Acyclic parameter setting offers the following options:

- Colour (off, red, green, amber, blue, purple, cyan, white, yellow, white monochrome)
- Appearance (continuous lighting, slow/medium/fast blinking, slow/medium/fast flashing)
- Intensity (0...100%)

Example:

Setting-A: red, blinking fast, 100%

Setting-B: yellow, continuous lighting, 100%

Setting-C: green, continuous lighting, 100%

This is how this single-segment signalling device can replace a 3-segment signal lamp without having to adjust the software of the installation. If two inputs are triggered simultaneously, the appearance of Setting-A will have a higher priority than Setting-B. Setting-B will have a higher priority than Setting-C.

4.4.1.1 Default behaviour

Priority	Intensity / appearance / colour	Description
Setting-A (high)	75% / continuous lighting / red	Activation of Setting-A
Setting-B (medium)	75% / continuous lighting / amber	Activation of Setting-B
Setting-C (low)	75% / continuous lighting / green	Activation of Setting-C

4.4.2 RGB mode

RGB mode is only available for devices operated in IO-Link mode. All settings, such as colour, appearance and intensity, are exclusively defined via the cyclic process data. Parameters set in ON/OFF mode are not taken into account in RGB mode.

In RGB mode, the colour channels (red/green/blue/white) can be set individually in a value range of 0...255 via the process data. The priority levels defined in ON/OFF mode are not supported.



If white is enabled, only one additional colour can be activated. Otherwise, only white will be displayed.

4.5 Appearance

The following appearance settings are possible:

1. Continuous lighting
2. Blinking (pulse/pause ratio = 50%)
 - Slow
 - Medium
 - Fast
3. Flashing (pulse/pause ratio = 10%)
 - Slow
 - Medium
 - Fast

Speed	f	T
Slow	0.5 Hz	2 s
Medium	1.5 Hz	0.67 s
Fast	2.5 Hz	0.4 s

4.6 Demo mode

Demo mode is supported in IO-Link operation and in standard IO operation. In IO-Link operation, the demo mode is only executed if IO-Link communication is taking place. When operated as a standard IO device (SIO), the demo mode is only executed if no IO-Link communication is taking place. In all other cases, the LED strip is switched off.

In demo mode, the predefined colours are changed cyclically. Three demo speeds can be selected:

Speed	Colour change interval
Slow	10 s
Medium	5 s
Fast	2.5 s



The demo mode has a higher priority than the normal operating mode. To return to the operating mode, the demo mode must be deactivated.

The demo mode is activated and deactivated via the IO-Link parameter [Demo mode].

5 Installation



The following applies to all types of mounting:

The responsibility for the compliance with the requirements concerning mounting of the device in the application with regard to shock, vibration, acceleration and weight lies with the system architect.

- ▶ Mount the device on a suitable surface.
- ▶ When installing the device in a plant, use only suitable mounting accessories (e.g. E89209 mounting clip, cable ties).

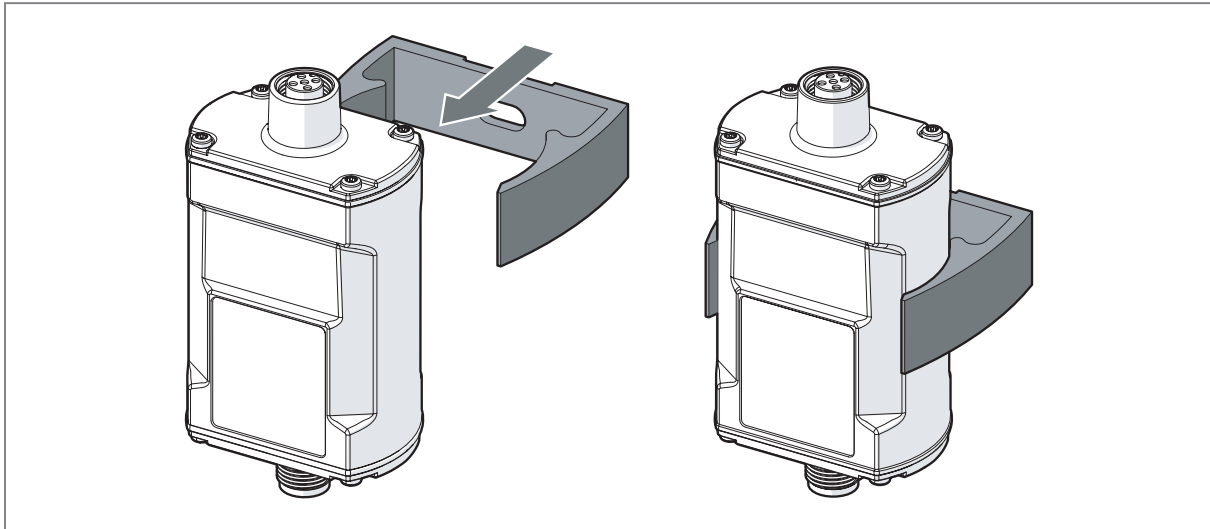


Fig. 3: Installation with mounting clip

- ▶ When using cable ties, use the recesses of the device as a guide (→ figure). Min. width of the cable ties: 2 mm.

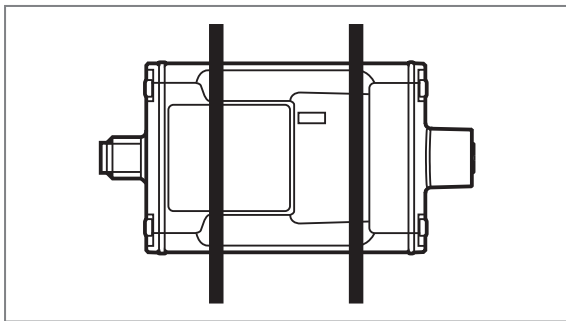


Fig. 4: Installation with cable ties



When attaching the cable ties, make sure that the LED of the device is not covered.

- ▶ During installation and replacing the device, ensure that the pollution degree is 2 or better.

6 Electrical connection



The unit must be connected by a qualified electrician.

► Observe the national and international regulations for the installation of electrical equipment.

The circuit is insulated from device surfaces that could be touched with basic insulation according to IEC 61010-1 (secondary circuit with max. 32 V DC, supplied from the mains circuit up to 300 V of overvoltage category II).

The external wiring has to be carried out in a way that ensures the required separation from other circuits.

The device must only be connected to a single voltage source.

Two connection options:

- IO-Link (RGB mode):
L+ on pin 1 or on pin 2
- Standard IO (ON/OFF mode):
Pin 1 (Setting-C), Pin 2 (Setting-B), Pin 4 (Setting-A)

6.1 Input side

Operating voltage (SELV/PELV)

6.2 Connecting the device

► Disconnect power.

► Connect the unit as follows:

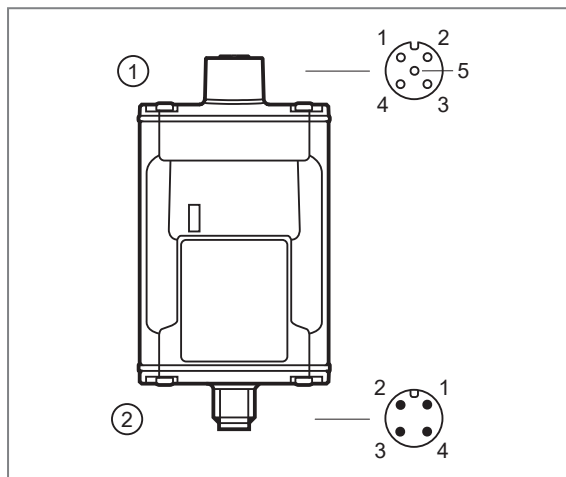


Fig. 5: Electrical connection

1: 5-pole M12 socket (output side)

- Pin 1: OUT1 / DO1 (red)
- Pin 2: OUT2 / DO2 (green)
- Pin 3: GND
- Pin 4: OUT3 / DO3 (white)
- Pin 5: OUT4 / DO4 (blue)

2: 4-pole M12 connector (input side)

- | | |
|------------------------|-------------------------------|
| IO-Link
(RGB mode): | Standard IO
(ON/OFF mode): |
| • Pin 1: L+ | • Pin 1: L+ / IN1 (Setting-C) |
| • Pin 2: L+ | • Pin 2: L+ / IN2 (Setting-B) |
| • Pin 3: GND | • Pin 3: GND |
| • Pin 4: IO-Link (C/Q) | • Pin 4: L+ / IN3 (Setting-A) |



The device must not be externally supplied via the 5-pole M12 socket ①.



Always use the provided connection cables to connect other devices.

See also application examples (→ Intended use)

6.2.1 Mounting the connector

The threaded connections in the device correspond to the M12 standard. To ensure compliance with the specified protection rating, only cables that comply with this standard may be used. In the case of self-assembled cables, the system manufacturer is responsible for the protection rating.

- ▶ Use connectors with gold-plated contacts.
- ▶ During installation, place the connectors vertically so that the coupling nut will not damage the thread.
- ▶ Observe the coding of the connectors during installation.

If connector in the device:

- ▶ Tighten the cable sockets according to the torque specifications indicated by the cable vendor.
Maximum permissible tightening torque: 1.8 Nm

If sockets in the device:

- ▶ Tighten the cable plug using 1.3 ± 0.1 Nm.
- ▶ Provide all outgoing cables with suitable strain relief after a maximum of 200 mm. Observe the minimum bending radius of the cables (→ information from the cable manufacturer).

6.2.1.1 Maximum cable length

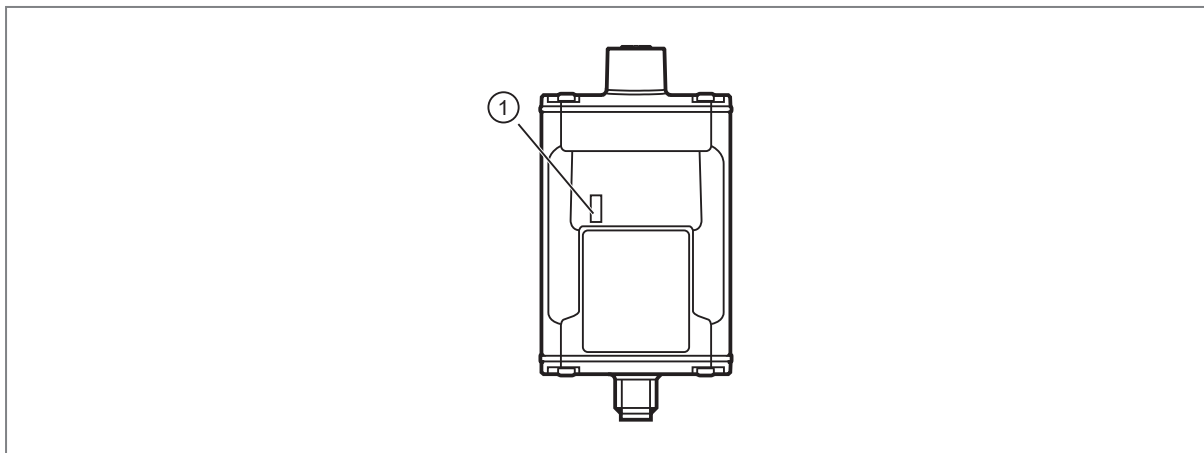
- Without IO-Link communication: 30 m on each side
- With IO-Link communication: 20 m on the master side

6.2.2 UL applications

To connect devices, only use UL-certified cables belonging to category CYJV or PVVA with a minimum temperature of 80 °C (75 °C in case of a maximum ambient temperature of 40 °C).

7 Operating and display elements

The device has a green LED to indicate the voltage supply. The LED strip must be connected separately. The device is configured exclusively via IO-Link.



1: LED PWR

LED	Colour	Status	Designation
PWR	Green	On	Voltage supply OK. Device in operating mode.
		Off	No voltage supply. Device switched off.

Error signals and diagnostics: [Troubleshooting](#) (→ [17](#))

8 Menu

8.1 General



The parameters of the device can only be set via an IO-Link tool.



Parameter cloning and parameter setting backup is possible with an IO-Link tool.

8.2 Application-specific tag

Customer-specific application description, max. 32 characters long.

Default value: " *** " / can be freely defined by the customer

8.3 Location tag

Customer-specific location tag of the unit, max. 32 characters long.

Default value: " *** " / can be freely defined by the customer

8.4 Function tag

Customer-specific function tag of the unit, max. 32 characters long.

Default value: " *** " / can be freely defined by the customer

8.5 ModE — operating mode

Definition of the operating mode to be used:

- ON/OFF mode (default)
- RGB mode



The structure of the process data and the use of parameters vary depending on the operation mode.

8.6 Segment colour – colour setting

Sets the colours for the priority levels in ON/OFF mode: [Operating modes \(→ 7\)](#)

8.7 Segment appearance – lighting behaviour

Sets the appearance of the connected LED strips.

Can be set in ON/OFF mode via IO-Link parameter and in RGB mode via the process data.

See: [Appearance \(→ 8\)](#)



The process data in the device will be lost after a restart.

8.8 Segment intensity – brightness

Sets the brightness of the connected LED strips.

Can be set in ON/OFF mode via IO-Link parameter and in RGB mode via the process data.



The process data in the device will be lost after a restart.

8.9 Demo mode

Activates/deactivates the demo mode.

8.10 internal_temperature – operating temperature microcontroller

Reads the data from the internal temperature sensor of the microcontroller.

8.11 operation_hours – operating hours

Only counts full operating hours. Operating times of less than one full hour are not saved. Counter readings are saved permanently.

8.12 operation_hoursfromstart – operating hours since the last start

Counts the operating hours since the last start. Counter values are not saved permanently.

8.13 Resetting the device

The device supports two different system commands for device reset:

- Application reset:
 - The device only resets technology-specific application parameters.
 - Identification parameters remain unchanged, e.g. Function Tag, Location Tag and Application-Specific Tag.
 - The IO-Link master is not disconnected.
- Back-to-box:
 - The parameters of the device are set to factory default values.
 - The connection to the IO-Link master will be inhibited until the next power cycle; to re-establish the connection, detach and reconnect the M12 socket.

8.14 FLASH_ON – activate flashing of the display

Used to identify a unit. The connected LED strip flashes cyan.

8.15 FLASH_OFF – deactivate flashing of the display

Deactivates the flashing of the display.

9 Operation

After power on, the device is in the operating mode (SIO).

10 Troubleshooting

External LED strip	Power LED DP1615	Error	Troubleshooting
Off	Off	Supply voltage too low	Check/correct the supply voltage: Electrical connection (→ □ 11)
Off	On	Voltage supply above or below specification of LED strip	Check/correct the supply voltage: Electrical connection (→ □ 11) See also technical data at documentation.ifm.com
Off	On	Short circuit/overload	Check load
Off / irregular flashing in the colour last set	On	Temperature too high	Check temperature / cool device
Off	On	Demo mode activated	Check configuration, deactivate demo mode
Regular colour change	On	Parameter change has no effect on appearance	Check configuration, deactivate demo mode
White	On	LED strip only lights white although more than one colour has been activated	Activate only one colour in addition to white.
Flashing cyan	On	System command [FLASH_ON] active	Execute system command [FLASH_OFF].
No changes	On	IO-Link connection lost	Re-establish IO-Link communication

11 Maintenance, repair and disposal

Cleaning the unit:

- ▶ Disconnect the unit from the voltage supply.
- ▶ Clean the unit from dirt using a soft, chemically untreated and dry micro-fibre cloth.

The operation of the unit is maintenance-free.

Only the manufacturer is allowed to repair the unit.

- ▶ After use dispose of the device in an environmentally friendly way in accordance with the applicable national regulations.