BALLUFF

BTL BNC_00-____-C15A___0-_____
BTL ZNC_00-____-C15A___0-_____

User's guide

english

www.balluff.com

1 About this guide

1.1 Validity

This guide provides all the information required for the safe use of the BTL magnetostrictive linear position sensor (measurement system) with analog current and voltage interface.
It applies to the following models (see *Type code* on page 22):

– **BTL BNC_00-____-C15A___0-_____**
– **BTL ZNC_00-____-C15A___0-_____**

Read this guide and the other applicable documents completely before installing and operating the product.

Original User's guide

This guide was created in German. Other language versions are translations of this guide.

1.2 Other applicable documents

Additional information about this product can be found at **www.balluff.com** on the product page, e.g. in the following documents:

– Data sheet
– Declaration of Conformity
– Disposal

1.3 Symbols and conventions

Individual **actions** are indicated by a preceding triangle.

► Instruction 1

Action sequences are numbered consecutively:

1. Instruction 1
2. Instruction 2

Note, tip
This symbol indicates general notes.

1.4 Explanation of the warnings

Always observe the warnings in this guide and the measures described to avoid hazards.

The warnings used here contain various signal words and are structured as follows:

SIGNAL WORD

Type and source of the hazard
Consequences if not complied with
► Measures to avoid hazards

The individual signal words mean:

NOTICE
Identifies a danger that could **damage or destroy the product**.

⚠ DANGER
The general warning symbol in conjunction with the signal word DANGER identifies a hazard which, if not avoided, will certainly result in **death or serious injury**.

1.5 Abbreviations

BET Balluff Engineering Tool
FMM Flexible Magnet Mode

2 Safety notes

2.1 Intended use

The BTL magnetostrictive linear position sensor, together with a machine controller (e.g. PLC), comprises a position measuring system. It is intended to be installed into a machine or system and used in the industrial sector.

Proper function according to the specifications in the technical data is only assured when the product is used solely as described in the user's guide and the respective documents as well as in compliance with the technical specifications and requirements and only with suitable original Balluff accessories.

Otherwise, there is deemed to be unintended use. Unintended use is not permitted and will result in the loss of warranty and liability claims against the manufacturer.

2.2 Reasonably foreseeable misuse

The product is not intended for the following applications and areas and may not be used there:

- In safety-oriented applications in which personal safety depends on the device function
- In explosive atmospheres
- In food applications

2.3 General safety notes

Activities such as **installation**, **connection** and **commissioning** may only be carried out by qualified personnel.

Qualified personnel are persons whose technical training, knowledge and experience as well as knowledge of the relevant regulations allow them to assess the work assigned to them, recognize possible hazards and take appropriate safety measures.

The **operator** is responsible for ensuring that local safety regulations are observed.
In particular, the operator must take steps to ensure that a defect in the product will not result in hazards to persons or equipment.

The product must not be opened, modified or changed. If defects and unresolvable faults occur in the product, take it out of service and secure against unauthorized use.

3 Scope of delivery, transport and storage

3.1 Scope of delivery

– Sensor
– Installation guide

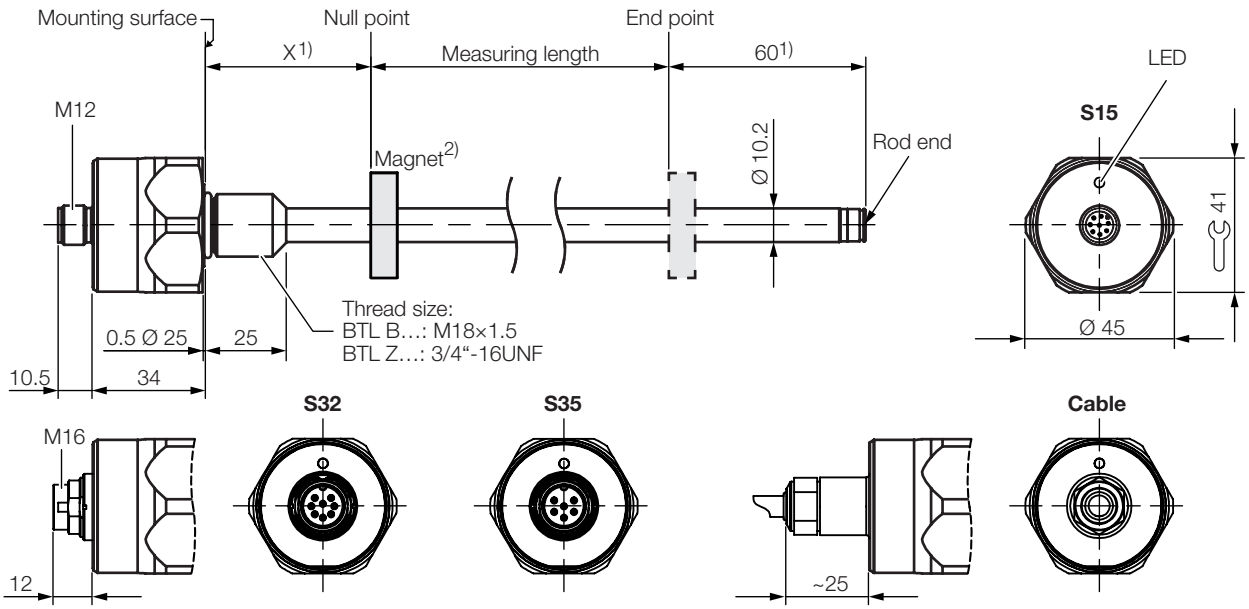
3.2 Transport

► Transport product to location of use in original packaging.

3.3 Storage conditions

► Store product in original packaging.
► Observe ambient conditions (see *Ambient condition* on page 19).

4 Product description



1) Unusable area
2) Not included in scope of delivery

Type	X	Rod end
BTL _NC**A**…	30 –1 mm	with thread M4/4.5 deep
BTL _NC**E**…	2" –0.04"	with thread M4/4.5 deep

Fig. 4-1: Dimensions, design and function

4.1 Construction

Electrical connection: The electrical connection is made via a cable or connector (see *Type code* on page 22).

Housing: Housing containing the processing electronics.

Fastening: We recommend assembling the following BTLs on the mounting thread:

– BTL B…: M18×1.5
– BTL Z…: 3/4"-16UNF

There is an additional thread at the end of the rod to support large measuring lengths.

Magnet: Defines the position to be measured on the waveguide. Magnets are available in various models and must be ordered separately (see *Accessories* on page 21).

Measuring length: Defines the travel/length range available. Sensors with measuring lengths from 25 mm to 4000 mm are available.

4 Product description (continued)

4.2 Function

To determine the position of a plant component, a magnet is connected to the component. Together they are moved along a waveguide located inside the BTL.

An internally generated INIT pulse interacts with the magnetic field of the magnet to generate a torsional wave in the waveguide which propagates at ultrasonic velocity. The component of the torsional wave which arrives at the end of the waveguide is absorbed in the damping zone to prevent reflection. The component of the torsional wave which arrives at the beginning of the waveguide is converted by a coil into an electrical signal. The position of the magnet and thus at the same time that of the plant component is determined from the running time of the shaft.

Depending on the version, 1 or 2 outputs are available and the position is output as a voltage or current value with rising or falling gradient.

Up to 2 magnets can be used for FMM (Flexible Magnet Mode).
The following functions can be selected for the output values:

– Position
– Velocity
– Position difference

> The entire range of functions can only be configured with the PC software *BALLUFF ENGINEERING TOOL (BET)*. For this, the IO-Link master must be connected. Communication is realized via IO-Link.

4.3 Display elements

Signal	Meaning
Green	**Normal function** Magnet is within the measuring range.
Yellow flashing, 3 Hz	**Warning** Magnet is outside the measuring range.
Red flashing, 1 Hz	**Measurement error** No magnet
Red flashing, 3 Hz	**Output error**[1] Short-circuit at voltage output or interruption on current output.

[1] Is only displayed for versions with 2 current outputs if the error is present at the same time at both outputs.

Tab. 4-1: LED display

With 1 magnet and 2 outputs the priority of the LED display is as follows (highest to lowest priority):

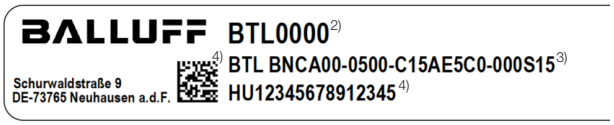
– Output error
– Measurement error
– Warning
– Normal function

For FMM (Flexible Magnet Mode) with 1 magnet the LED display relates to output 1 (output 2 issues the error value continuously).

For FMM (Flexible Magnet Mode) with 2 magnets the LED display shows the status with the highest priority of both outputs.

More than 2 magnets are ignored.

4.4 Part label



[2] Order code
[3] Type
[4] Serial number

Fig. 4-2: Part label (excerpt, example)

5 Installation and connection

5.1 Preparing for installation

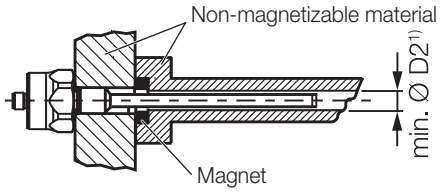
Installation

Two mounting options are provided:
- Mounting in a hole with internal thread (mounting hole).
- Mounting in a through-hole (without internal thread) using a mounting nut (see *Accessories* on page 21).

Installation guidelines

a) Installation in non-magnetizable material

We recommend using non-magnetizable material to mount the BTL and magnet.

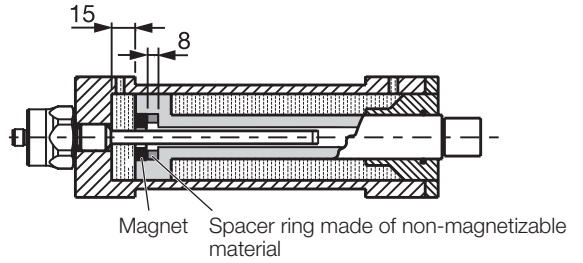


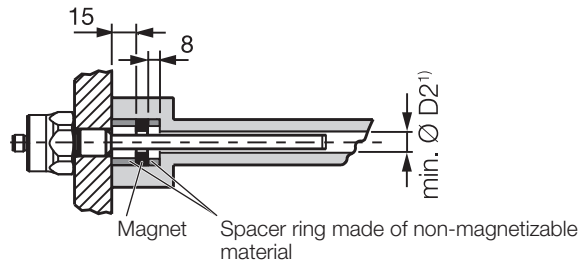
[1)] min. Ø D2 = Minimum bore diameter (see Tab. 5-1)

Fig. 5-1: Installation in non-magnetizable material

b) Installation in magnetizable material

If using magnetizable material, the BTL must be protected against magnetic interference through suitable measures (e.g. spacer ring made of non-magnetizable material, a suitable distance from strong external magnetic fields).





[1)] min. Ø D2 = Minimum bore diameter (see Tab. 5-1)

Fig. 5-2: Installation in magnetizable material

Installation instructions

Hydraulic cylinder: If installed in a hydraulic cylinder, the magnet should not make contact with the rod. Minimum bore diameter in the support piston:

Rod diameter	Bore diameter D2
10.2 mm	At least 13 mm

Tab. 5-1: Bore diameter if installed in a hydraulic cylinder

Mounting hole: Depending on the version, the BTL comes with an M18×1.5 thread (according to ISO) or a 3/4“-16UNF thread (according to SAE) to secure it. Accordingly, the mounting must be made before assembly.

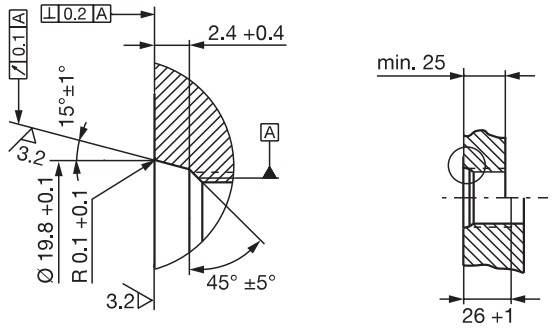


Fig. 5-3: Mounting hole M18×1.5 per ISO 6149 O-ring 15.4×2.1

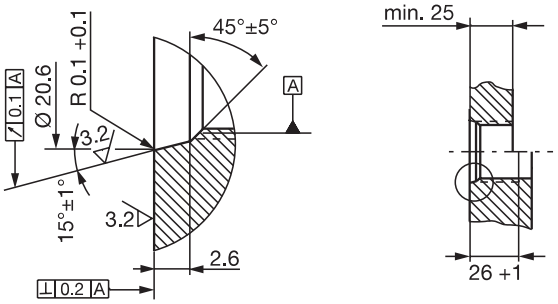


Fig. 5-4: Mounting hole 3/4“-16UNF per SAE J475 O-ring 15.3×2.4

Horizontal mounting: For horizontal mounting with measuring lengths > 500 mm, support the rod and, if necessary, screw it on at the end (with threaded rod end).

Magnet: Various magnets are available for the BTL (see *Accessories* on page 21).

5 Installation and connection (continued)

Installation recommendation for hydraulic cylinders

If installing horizontally in a hydraulic cylinder (measuring lengths > 500 mm), we recommend affixing a slide element to protect the rod end from wear.

> Dimensioning of the detailed solutions is the responsibility of the cylinder manufacturer.

The slide element material must be suitable for the appropriate load case, medium used, and application temperatures. E.g. Torlon, Teflon or bronze are all possible materials.

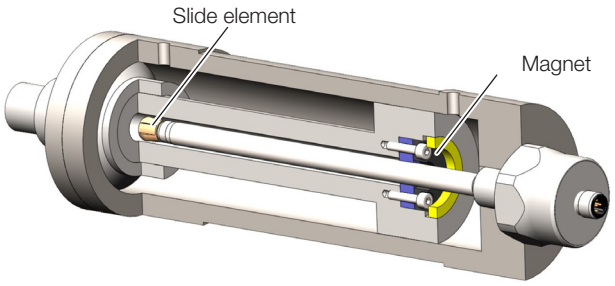


Fig. 5-5: Example 1, BTL installed with slide element

The slide element can be screwed on or bonded.

- ► Secure the screws so they cannot be loosened or lost.
- ► Select a suitable adhesive.

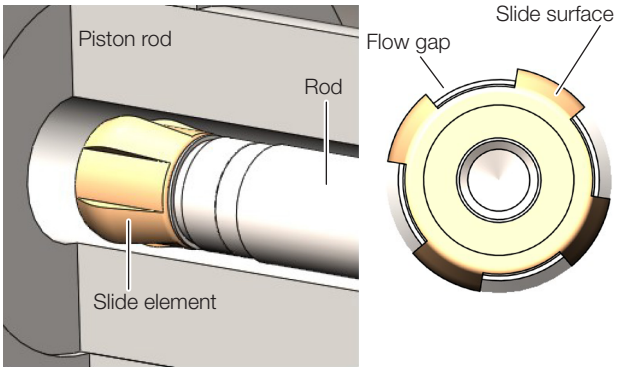


Fig. 5-6: Detailed view and top view of slide element

There must be a gap between the slide element and piston bore that is sufficiently large for the hydraulic oil to flow through.

Options for fixing the magnet:

- – Screws
- – Threaded ring
- – Press fitting
- – Notches (center punching)

> If installed in a hydraulic cylinder, the magnet should not make contact with the rod.

The hole in the spacer ring must ensure optimum guidance of the rod by the slide element.

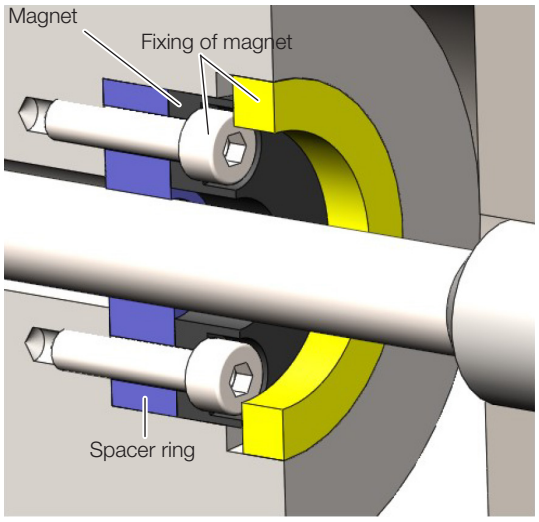


Fig. 5-7: Fixing of magnet

5 Installation and connection (continued)

5.2 Installation

> For dimensions, see Fig. 4-1 on page 8.

> Suitable nuts for the mounting thread are available as accessories (see page 21).

NOTICE

Interference in function

Improper installation can compromise the function of the BTL and result in increased wear.

- ► Ensure that the contact surface of the BTL is in full contact with the mounting surface.
- ► Seal the hole perfectly (O-ring/flat seal).

Mounting in a hole with internal thread (mounting hole)

1. Make a mounting hole with thread (possibly with countersink for the O-ring) acc. to Fig. 5-3 or Fig. 5-4.
2. Screw the BTL with mounting thread into the mounting hole (max. torque 75 Nm).

Mounting in a through-hole

> Mounting in a through-hole is only permitted under ambient atmospheric pressure.

1. Guide the BTL through the hole.
2. Screw the mounting nut (max. torque 75 Nm, see *Accessories* on page 21) onto the mounting thread on the rod side.

Further steps

- ► Install the magnet (accessory).
  When using multiple magnets a minimum separation of 65 mm must be maintained between them.

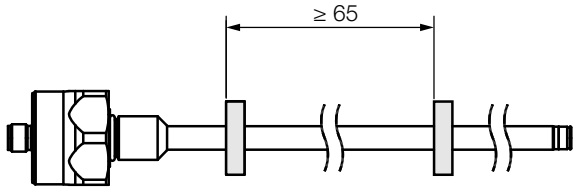


Fig. 5-8: Minimum spacing when using multiple magnets

- ► From measuring length of 500 mm: Support the rod and if necessary screw on at the end.

5.3 Electrical Connection

Depending on the model, the electrical connection is made using a cable or a connector. The connection or pin assignments for the respective version can be found in Tab. 5-2 to Tab. 5-5.

> See the information about *Shielding and cable routing* on page 13.

5.3.1 Connectors

S15 connector

Fig. 5-9: Pin assignment of S15 (view from above on BTL)

Pin	Signal
1	0 V (output 2)
2	0 V (output 1)
3	Output 2
4	C/Q[1]
5	Output 1
6	GND[2]
7	10…30 V
8	Not assigned[3]

[1] only for configuration via IO-Link

[2] Reference potential for supply voltage and EMC-GND

[3] Unassigned leads that are not used can be connected to the GND on the controller side but not to the shield.

Tab. 5-2: Pin assignment S15

5 Installation and connection (continued)

S32 connector

Fig. 5-10: Pin assignment of S32 (view from above on BTL)

Pin	C15AA/A1…	C15AE/A5…
1	Not used	Output 1
2	0 V	
3	Output 2	
4	C/Q[1]	
5	Output 1	Not used
6	GND[2]	
7	10…30 V	
8	Not assigned[3]	

[1] only for configuration via IO-Link

[2] Reference potential for supply voltage and EMC-GND

[3] Unassigned leads that are not used can be connected to the GND on the controller side but not to the shield.

Tab. 5-3: Pin assignment S32

S35 connector

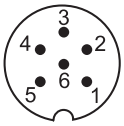


Fig. 5-11: Pin assignment of S35 (view from above on BTL)

Pin	C15AA/A1…	C15AE/A5…
1	Output 1	Output
2	0 V (output 1)	0 V
3	Output 2	Not assigned[1]
4	0 V (output 2)	Not assigned[1]
5	10…30 V	
6	GND[2]	

[1] Unassigned leads that are not used can be connected to the GND on the controller side but not to the shield.

[2] Reference potential for supply voltage and EMC-GND

Tab. 5-4: Pin assignment S35

5.3.2 Cable connection

Color	Signal
GY gray	0 V
PK pink	Output 2
WH white	C/Q[1]
GN green	Output 1
BU blue	GND[2]
BN brown	10…30 V

[1] only for configuration via IO-Link

[2] Unassigned leads that are not used can be connected to the GND on the controller side but not to the shield.

Tab. 5-5: Connection assignment, cable

5.4 Shielding and cable routing

Defined ground!
The BTL and the control cabinet must be at the same ground potential.

Shielding
Observe the following instructions to ensure electromagnetic compatibility (EMC):
– Connect BTL and controller using a shielded cable. Shielding: Braided copper shield with minimum 85% coverage.
– Shield is internally connected to connector housing.

Magnetic fields
The position measuring system is a magnetostrictive system. Ensure that there is sufficient distance between the BTL and the transducer/holding cylinder and strong, external magnetic fields.

Cable routing
All cables between BTL, control and power supply must be routed tension-free. In order to avoid electromagnetic interference, ensure sufficient distance to cables carrying a heavy current and cables with high-frequency voltage signals (e.g. of frequency converters).

Only approved cables with a minimum size of AWG 24 may be used. All connected cables must have a temperature resistance of at least 85 °C. Use copper conductor, only.

Cable length

BTL …-C15AA/A1…	Max. 30 m[1]
BTL …-C15AE/A5…	Max. 100 m[1]

[1] Prerequisite: Construction, shielding and routing preclude the effect of any external noise fields.

Tab. 5-6: BTL cable lengths

6 Startup and operation

6.1 Startup

⚠ DANGER

Uncontrolled system movement

When starting up, if the sensor is part of a closed loop system whose parameters have not yet been set, the system may perform uncontrolled movements. This could result in personal injury and equipment damage.

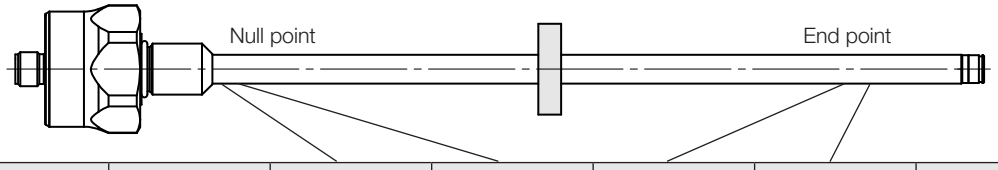
- ► Persons must keep away from the system's hazardous zones.
- ► Startup must be performed only by trained technical personnel.
- ► Observe the safety instructions of the equipment or system manufacturer.

1. Check connections for tightness and correct polarity. Replace damaged connections.
2. Turn on the system.
3. Check measured values and adjustable parameters and readjust the BTL if necessary. Check the values over the entire measuring range.

i Check for the correct values, especially after replacing the BTL or after repair by the manufacturer.

6 Commissioning and operation (continued)

6.2 Operation



Characteristic curve	BTL	Unit	Minimum value	Null value	End value	Maximum value	Error value
Rising	…-C15AA…	V	–0.4	0	10.0	10.4	10.5
	…-C15AE…	mA	3.6	4.0	20.0	20.4	1.8
Falling	…-C15A1…	V	10.4	10.0	0	–0.4	10.5
	…-C15A5…	mA	20.4	20.0	4.0	3.6	1.8

Tab. 6-1: Table of values

6.3 Operating notes

- Some settings can be modified (see *Configuration with the Balluff Engineering Tool (BET)* on page 16) (does not apply to BTL _NC…S35).
- Regularly check function of the BTL and all associated components.
- Take the BTL out of operation whenever there is a malfunction.
- Secure the system against unauthorized use.
- Check fasteners and retighten if needed.

6.4 Maintenance

The product is maintenance-free.

7 Configuration with the Balluff Engineering Tool (BET)

7.1 Balluff Engineering Tool (BET)

NOTICE

Interference in function

Configuration with the BET while the system is running may result in malfunctions.

► Stop the system before performing the configuration.

With the PC software BET the BTL can be quickly and easily configured on the PC (does not apply to BTL _NC…S35).

The PC software and the relevant configuration guide can be found online at **www.balluff.com** on the product page.

7.2 Connect units

The units must be connected for configuration with the BET (connector version see Fig. 7-1, cable version see Fig. 7-2).

BTL connector version

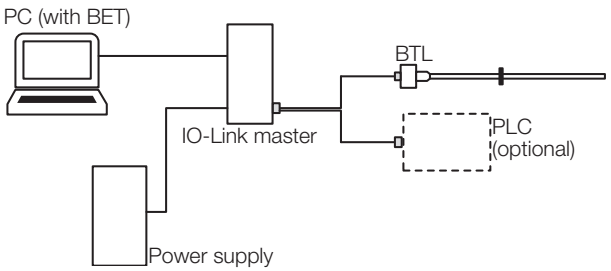


Fig. 7-1: Connection of units with BTL connector version

► Connect BTL to the master via the adapter cable (accessory).
► *Optional*: Also connect outputs to the control (PLC) via the adapter cable.
► Connect PC (with BET) to the master.

BTL cable version

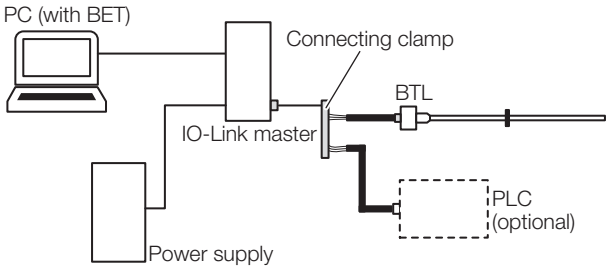


Fig. 7-2: Connection of units with BTL cable version

► Connect BTL cable to the master via the adapter cable (accessory), e.g., using a connecting clamp.
Assignment of wire colors:

BTL cable	Adapter cable, master
BN (brown)	BN (brown)
BU (blue)	BU (blue)
WH (white)	BK (black)

► *Optional*: Connect outputs to the control (PLC) via the adapter cable.
► Connect PC (with BET) to the master.

7 Configuration with the Balluff Engineering Tool (BET) (continued)

7.3 Configuration options

⚠ DANGER

Uncontrolled system movement

When starting up, if the position measuring system is part of a closed loop system whose parameters have not yet been set, the system may perform uncontrolled movements. This could result in personal injury and equipment damage.

- ► The system must be taken out of operation before configuration.
- ► The position sensors may only be connected to the master box for configuration.
- ► The master box must be removed after configuration.

Prerequisites

i Configuration with BET is not possible for BTL _NC…S35.

- BTL connected to IO-Link master and PC.
- Software correctly installed.
- BTL connected to the power supply.
- Magnet on BTL.

i Further information can be found in the configuration guide online at **www.balluff.com** on the product page.

Magnet and outputs

Possible factory default of number of magnets:

- One magnet
- Flexible Magnet Mode (FMM)

Two outputs can be assigned independent of each other. The number of magnets set can be fixed or flexible.

- **Fixed setting, one magnet:** With the setting of one magnet, a second magnet is ignored.
- **Flexible Magnet Mode (FMM):** With Flexible Magnet Mode the number of magnets is flexible so that it can also be changed during operation. If there are two magnets on the BTL, the respective output function is output via the outputs. If there is only one magnet on the BTL, its output function is always output via output 1. As there is no second magnet, output 2 always issues the error value.

Functions of the outputs

- **Position:** in measuring range.
- **Position difference:** Distance between two magnets. The selection is only possible if Flexible Magnet Mode (FMM) is selected for the number of magnets.
- **Speed:** Speed of the magnet. The sign displays the movement direction. Movement from zero point to end point is displayed with a positive sign. Movement from end point to zero point is displayed with a negative sign. The maximum measurable speed range is –10…+10 m/s.

Status of the outputs

- Status of the analog outputs is readable.

Freely configurable curve

- Zero and end points can be taught-in (Teach-In).
- The distance between zero point and end point must be at least 10 mm.
- The characteristic curve can be inverted.
- The limits can be adjusted to the measuring range.
- The error value can be set according to the limits.

Condition with two magnets

- The distance between two magnets must be at least ≥ 65 mm.

8 Repair and disposal

8.1 Repair

Repairs to the product may only be performed by Balluff.
If the product is defective, contact our Service Center.

8.2 Disposal

► Observe the national regulations for disposal.

Additional information can be found at **www.balluff.com** on the product page.

9 Technical data

The specifications are typical values for BTL BNC_00-____-C15A___0-_____ and BTL ZNC_00-____-C15A___0-_____ at 24 V DC, room temperature and a measuring length of 500 mm in conjunction with the BTL-P-1013-4R, BTL-P-1013-4S, BTL-P-1012-4R or BTL-P-1014-2R magnet.

The product is immediately ready for operation, full accuracy is achieved after the warm-up phase.

Further data can be found at **www.balluff.com** on the product page.

9.1 Ambient condition[1)]

Ambient temperature	–40…+85 °C
Storage temperature	–40…+100 °C
Relative humidity	≤ 90%, non-condensing
Operating pressure	≤ 450 bar
Short term pressure	750 bar (10 × 1 min)
Typ. temperature coefficient[2)]	≤ 30 ppm/K
Shock rating as per EN 60068-2-27[3), 4)]	100 g/6 ms
Continuous shock per EN 60068-2-27[3), 4)]	50 g/2 ms
Vibration per EN 60068-2-6[3), 4)]	12 g, 10 …2000 Hz
Protection per IEC 60529 (when threaded together)[5)]	IP67, IP69K

9.2 Detection range/Measuring range

Measuring length	25...4000 mm
Analog position resolution	
…-C15AA/-C15A1…	183 µV / ≥ 4 µm
…-C15AE/-C15A5…	351 nA / ≥ 4 µm
Repeat accuracy	
with measuring length ≤ 500 mm	≤ ±10 µm
with measuring length > 500 mm	≤ ±0.002% FS
Length-dependent measuring frequency	
Measuring length ≤ 1270 mm	1000 Hz
Measuring length > 1270 to ≤ 2650 mm	500 Hz
Measuring length > 2650 mm	250 Hz
Linearity deviation[6)]	
with measuring length ≤ 500 mm	±60 µm
with measuring length > 500 mm	±0.012% FS
Detectable speed	≤ 10 m/s
Analog speed resolution	
…-C15AA/-C15A1…	183 µV / ≥ 0.1 mm/s
…-C15AE/-C15A5…	351 nA / ≥ 0.1 mm/s

9.3 Electrical data

Operating voltage Ub[7)]	10…30 V DC
Current draw (at 24 V DC)	
…-C15AA_20-…/…-C15A1_20-…	≤ 65 mA
…-C15AA_40-…/…-C15A1_40-…	≤ 65 mA
…-C15AA_B0-…/…-C15A1_B0-…	≤ 65 mA
…-C15AA_C0-…/…-C15A1_C0-…	≤ 65 mA
…-C15AE010-…/…-C15A5010-…	≤ 70 mA
…-C15AE_B0-…/…-C15A5_B0-…	≤ 85 mA
…-C15AE_C0-…/…-C15A5_C0-…	≤ 85 mA
Power consumption	
…-C15AA_20-…/…-C15A1_20-…	≤ 1.6 W
…-C15AA_40-…/…-C15A1_40-…	≤ 1.6 W
…-C15AA_B0-…/…-C15A1_B0-…	≤ 1.6 W
…-C15AA_C0-…/…-C15A1_C0-…	≤ 1.6 W
…-C15AE010-…/…-C15A5010-…	≤ 1.7 W
…-C15AE_B0-…/…-C15A5_B0-…	≤ 2.1 W
…-C15AE_C0-…/…-C15A5_C0-…	≤ 2.1 W
Overvoltage protection	Ub up to 36 V DC
Voltage-proof up to (GND – Housing)	500 V DC
…-C15AA/-C15A1…	
Output current	≤ 5 mA
…-C15AE/-C15A5…	
Load resistance R_{Lc}	≤ 500 ohm

9.4 Electrical Connection

Short circuit protection	Signal output to GND and to 30 V DC
Protected against polarity reversal[8)]	Ub up to 30 V DC

1) For UL: Use in enclosed spaces and up to an altitude of 2000 m above sea level.
2) Measuring length 500 mm, magnet in the middle of the measuring range
3) Individual specifications as per Balluff standard
4) Resonant frequencies excluded
5) IP protection class not evaluated by UL
6) Configuration for one magnet
7) For UL: The BTL must be externally connected via a limited-energy circuit as defined in UL 61010-1, a lo-power source as defined in UL 60950-1 or a class 2 power supply as defined in UL 1310 or UL 1585.
8) A prerequisite is that no current can flow between GND and 0 V in the event of polarity reversal.

9 Technical data (continued)

9.5 Output / Interface

…-C15AA1… Analog, voltage	0…10 V / 10…0 V
…-C15A1A… Analog, voltage	10…0 V / 0…10 V
…-C15AE5… Analog, current	4…20 mA / 20…4 V
…-C15A5E… Analog, current	20…4 mA / 4…20 V

9.6 Materials

Housing material	Stainless steel
Rod material	Stainless steel

9.7 Mechanical features

Rod diameter	10.2 mm
Weight (depends on length)	Approx. 1 kg/m
Rod wall thickness	2 mm
Housing mounting via threads	
BTL B…	M18×1.5
BTL Z…	3/4“-16UNF

Cable version

Cable material	PUR cULus 20549 80 °C, 300 V, internal wiring
Cable temperature	–40…+90 °C
Cable diameter	Max. 7 mm
Permissible bending radius	
Fixed routing	≥ 35 mm
Moved	≥ 105 mm

9.8 Approvals and markings

The monitoring sensors BTL Basic Rod Series are restricted for use in industrial machinery applications as defined in the Electrical Standard for Industrial Machinery, NFPA 79.

The CE Mark verifies that our products meet the requirements of the current EU Directive.

Additional information on directives, approvals and standards can be found at **www.balluff.com** on the product page.

10 Accessories

Accessories are not included in the scope of delivery and must be ordered separately.

Recommended accessories can be found at **www.balluff.com** on the product page.

10.1 Magnet

BTL-P-1013-4R

Order code BAM013L

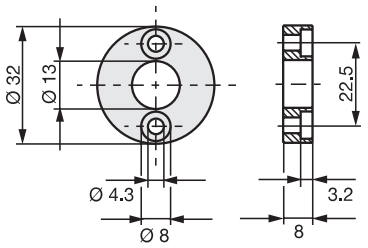


Fig. 10-1: Installation dimensions of BTL-P-1013-4R magnet

BTL-P-1013-4S

Order code BAM013P

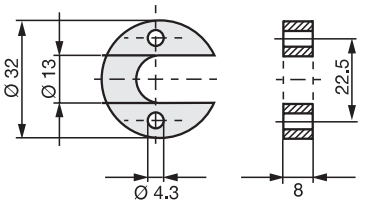


Fig. 10-2: Installation dimensions of BTL-P-1013-4S magnet

BTL-P-1012-4R

Order code BAM013J

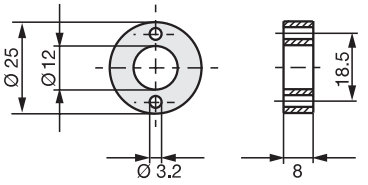


Fig. 10-3: Installation dimensions of BTL-P-1012-4R magnet

BTL-P-1014-2R

Order code BAM013R

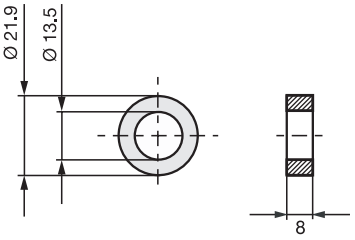


Fig. 10-4: Installation dimensions of BTL-P-1014-2R magnet

BTL-P-1013-4R, BTL-P-1013-4S, BTL-P-1012-4R, BTL-P-1014-2R:

Weight:	< 15 g
Housing:	Aluminum

Included in the scope of delivery for the BTL-P-1013-4R, BTL-P-1013-4S, BTL-P-1012-4R:

Spacer:	8 mm, material: polyoxymethylene (POM)

10.2 Mounting nut

BTL-A-FK01-E-M18×1.5

Order code BAM0118
Mounting nut M18×1.5

BTL-A-FK01-E-3/4“-16UNF

Order code BAM0117
Mounting nut 3/4"-16U

11 Type code

BTL BNCA00-0500-C15AE5C0-000S15

Rod version, fastening:
- B = Rod with metric mounting thread M18x1.5
- Z = Rod with inch thread 3/4“-16UNF

Mechanical zero point:
- A = Zero point at 30 mm; rod end with thread (only for BTL B…)
- E = Zero point at 50.8 mm; rod end with thread

Measuring length (4 digits):
- 0500 = Metric specification in mm; measuring length 500 mm (0025...4000)

Interface:
- A = Analog

Output 1:
- A = Voltage output 0…10 V
- 1 = Voltage output 10…0 V
- E = Current output 4…20 mA
- 5 = Current output 20…4 mA

Output 2:
- A = Voltage output 0…10 V
- 1 = Voltage output 10…0 V
- E = Current output 4…20 mA
- 5 = Current output 20…4 mA

Output configuration:
- 1 = Output 1: Position of magnet 1
- 2 = Outputs 1 and 2: Position of magnet 1
- 4 = Output 1: Position of magnet 1; Output 2: Position of magnet 2; FMM
- B = Output 1: Position of magnet 1; Output 2: Position of magnet 2; FMM; configurable with BET
- C = Outputs 1 and 2: Position of magnet 1, configurable with BET

Electrical connection:
- 000S15 = 8-pin, M12 plug
- 000S32 = 8-pin, M16 plug per IEC 130-9
- 000S35 = 6-pin, M16 plug per IEC 130-9
- CA5000 = Cable, 5 m (PUR)

954776_AC · EN · A24 ; Subject to modification. Replaces J22.

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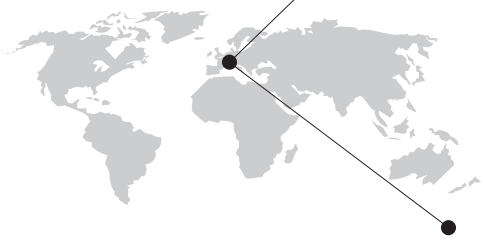

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