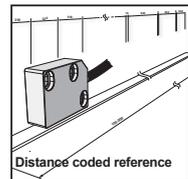
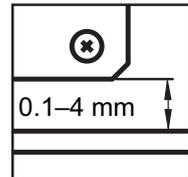


LM15 incremental magnetic encoder system



The LM15 is a contactless high-speed magnetic encoder designed for linear or rotary motion sensing in harsh environments.

The LM15 features a compact sealed readhead that rides at up to 4.0 mm from the self-adhesive magnetic scale or ring.

Simple to install, the LM15 features an integral set-up LED, wide installation tolerances and an applicator tool for the adhesive-backed magnetic scale. A bidirectional reference is provided that can be actuated by a preset mark integrated within the scale or ring.

The encoders come in digital or analogue output variants and offer a range of customer selectable resolutions from 0.61 μm to 625 μm .

Maximum speed depends on the chosen resolution and minimum edge separation time; eg. for linear

applications to 75 m/s at 10 μm . For more information about maximum speed in rotary applications go to [magnetic ring data sheet](#).

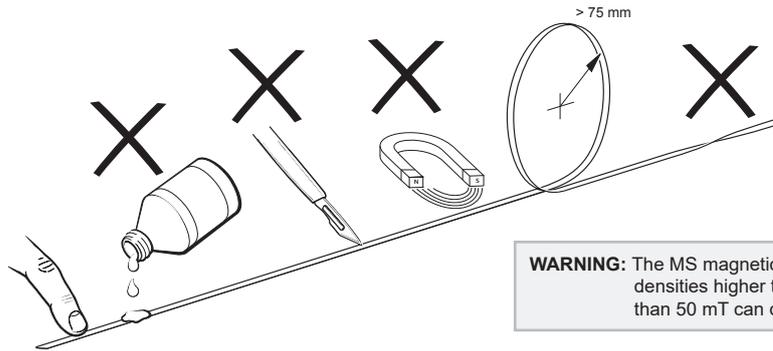
Engineered for extreme service, the solid-state LM15 linear encoders operate from $-10\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$, have water-proof sealing to IP68 and are highly resistant to shock, vibration and pressure. The robust magnetic scale and ring are also resistant to a range of chemicals commonly found in industry.

The non-contact, frictionless design eliminates wear while reducing hysteresis.

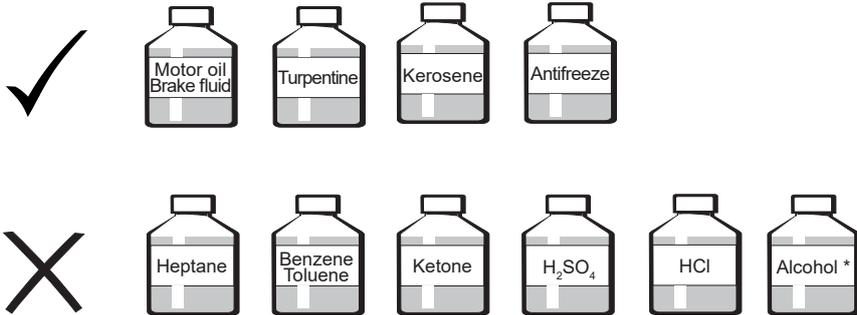
The LM15 encoders bring reliable solutions to tough, hard-working applications including woodworking, stone-cutting, sawing, metalworking, textiles, printing, packaging, plastics processing, automation and assembly systems, laser/flame/water-jet cutting, electronic assembly equipment etc.

- Customer selectable resolutions
- Bidirectional reference mark option
- High speed operation
- Excellent dirt immunity to IP68
- Integral set-up LED
- Linear or rotary position sensing possible
- High reliability from proven non-contact sensing technology
- Industry standard incremental digital and analogue output options
- CE compliant, including RoHS - see Declaration of conformity

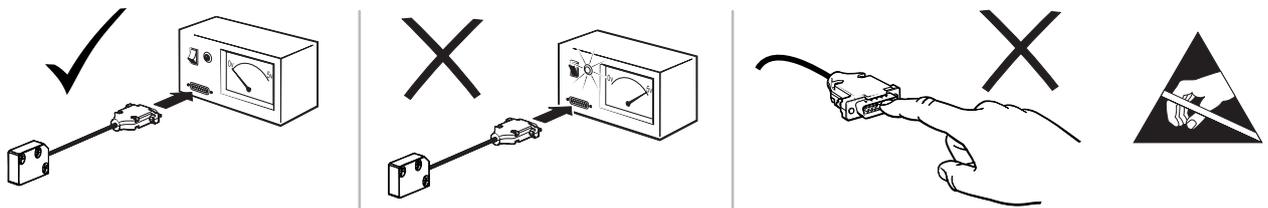
Storage and handling



WARNING: The MS magnetic scale should not be exposed to magnetic field densities higher than 50 mT on its surface. Magnetic fields higher than 50 mT can damage the scale.

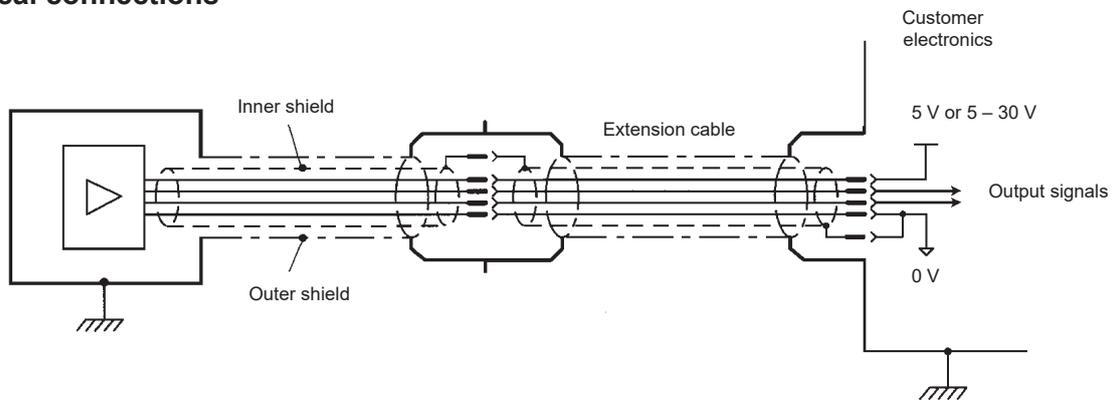


* Use of alcohol for cleaning is considered safe, however, it is not allowed to immerse the scale in alcohol.



For radial and axial ring storage and handling refer to [magnetic ring data sheet](#).

Electrical connections



Technical specifications

System data												
Maximum length for MS scale	100 m (up to 180 m per request)											
Pole length	5 mm											
Sinusoidal period length (for analogue voltage output)	5 mm											
For rotary maximum speed table refer to magnetic ring data sheet . Available resolutions and maximum speed for linear application:												
For analogue voltage output: 200 m/s For digital output signals:												
Part numbering	Resolution (µm)	Counts / 5 mm	Maximum speed (m/s)									
13B	≈ 0.61	8,192	4.56	2.28	0.57	0.28	0.15	0.08	0.06	0.03	0.02	
12B	≈ 1.22	4,096	9.12	4.56	1.14	0.57	0.30	0.15	0.12	0.06	0.03	
11B	≈ 2.441	2,048	18.24	9.12	2.28	1.14	0.59	0.30	0.24	0.12	0.06	
2D0	2.5	2,000	18.68	9.32	2.33	1.17	0.61	0.31	0.25	0.12	0.06	
1D6	3.125	1,600	23.32	11.68	2.92	1.46	0.76	0.39	0.31	0.15	0.08	
10B	≈ 4.882	1,024	36.44	18.24	4.56	2.28	1.19	0.61	0.48	0.24	0.12	
1D0	5	1,000	37.32	18.68	4.68	2.33	1.22	0.62	0.49	0.25	0.12	
D80	6.25	800	46.68	23.32	5.84	2.92	1.52	0.78	0.61	0.31	0.16	
09B	≈ 9.765	512	72.92	36.44	9.12	4.56	2.38	1.22	0.96	0.48	0.24	
D50	10	500	74.68	37.32	9.32	4.68	2.43	1.24	0.98	0.50	0.25	
D40	12.5	400	93.32	46.68	11.68	5.84	3.04	1.56	1.23	0.62	0.31	
D32	15.625	320	116.68	58.32	14.60	7.28	3.80	1.94	1.54	0.77	0.39	
08B	≈ 19.531	256	145.84	72.92	18.24	9.12	4.76	2.43	1.92	0.97	0.49	
D20	25	200	186.68	93.32	23.32	11.68	6.08	3.11	2.46	1.24	0.62	
D16	31.25	160	116.68	58.32	14.60	7.28	3.80	1.94	1.54	0.77	0.39	
07B	39.0625	128	200.00	145.84	36.44	18.24	9.52	4.86	3.84	1.94	0.97	
D10	50	100	186.68	93.32	23.32	11.68	6.08	3.11	2.46	1.24	0.62	
D08	62.5	80	116.68	58.32	14.60	7.28	3.80	1.94	1.54	0.77	0.39	
06B	78.125	64	200.00	200.00	72.92	36.44	19.04	9.72	7.67	3.87	1.95	
D04	125	40	116.68	58.32	14.60	7.28	3.80	1.94	1.54	0.77	0.39	
05B	156.25	32	200.00	200.00	145.84	72.92	38.04	19.45	15.35	7.74	3.89	
04B	312.5	16	N/A	200.00	200.00	145.84	76.08	38.89	30.70	15.48	7.78	
03B	625	8	N/A	N/A	200.00	200.00	152.16	77.78	61.40	30.97	15.56	
Minimum edge separation (µs)			0.07	0.12	0.50	1	2	4	5	10	20	
Part numbering			K	A	B	C	D	E	F	G	H	
Accuracy grade for MS scales	±100 µm											
Linear expansion coefficient for MS scale	~ 17 × 10 ⁻⁶ /K											
Repeatability	Better than unit of resolution for movement in the same direction											
Hysteresis	< 12.5 µm up to 1 mm ride height											
Mechanical data												
Mass	Readhead (1 m cable, no connector) 57 g, Cable (1 m) 34 g Magnetic scale (1 m) 60 g, Cover foil (1 m) 3.5 g											
Environmental data												
Temperature	Operating -10 °C to +80 °C (cable under non-dynamic conditions: -20 °C to +85 °C) Storage -40 °C to +85 °C											
Environmental sealing	IP68 (according to IEC 60529)											
EMC Immunity	IEC 61000-6-2 (particularly: ESD: IEC 61000-4-2; EM fields: IEC 61000-4-3; Burst: IEC 61000-4-4; Surge: IEC 61000-4-5; Conducted disturbances: IEC 61000-4-6; Power frequency magnet fields: IEC 61000-4-8; Pulse magnetic fields: IEC 61000-4-9)											
EMC Emission	IEC 61000-6-4 (for industrial, scientific and medical equipment: IEC 55011)											
Vibrations (55 Hz to 2000 Hz)	300 m/s ² (IEC 60068-2-6)											
Shocks (11 ms)	300 m/s ² (IEC 60068-2-27)											

Cable specifications

Cable type	PUR high flexible cable, drag-chain compatible, double-shielded	
Number of wires	8	12
Outer diameter	4.2 mm ±0.2 mm	4.5 mm ±0.2 mm
Jacket material	Extruded polyurethane (PUR)	
White wire	0.14 mm ² , 26 AWG, 0.13 Ω/m	0.08 mm ² , 28 AWG, 0.23 Ω/m
Other wires	0.05 mm ² , 30 AWG, 0.35 Ω/m	
Durability	20 million cycles at 25 mm bend radius	20 million cycles at 50 mm bend radius
Weight	34 g/m nominal	38 g/m nominal
Bend radius (internal radius)	Dynamic 25 mm, static 10 mm	Dynamic 50 mm, static 10 mm

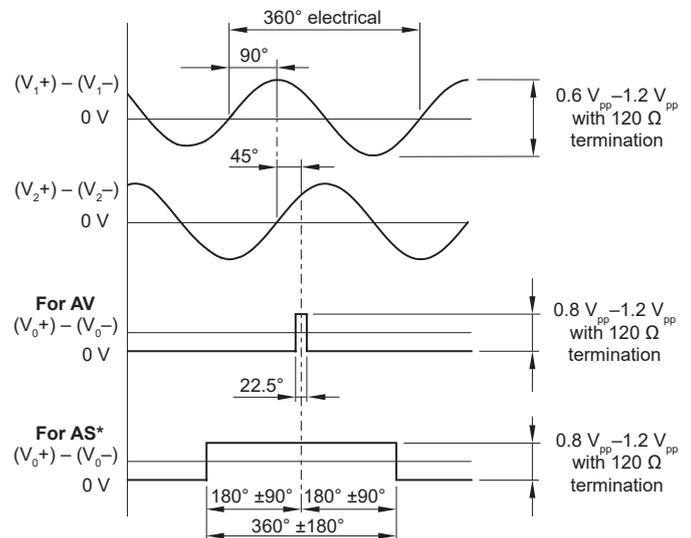
Output specifications

LM15AV and LM15AS* – Incremental analogue output signals (1 V_{pp})

2 channels V₁ and V₂ differential sinusoidals (90° phase shifted)

Power supply **	4.7 V to 7 V – voltage on readhead Reverse polarity protection	
Power consumption	< 50 mA	
Voltage drop over cable	~ 13 mV/m – without load ~ 54 mV/m – with 120 Ω load	
Output signals	V ₁ , V ₂ , V ₀	
Sine / cosine signals	Amplitude (with 120 Ω termination)	0.6 V _{pp} to 1.2 V _{pp}
	Phase shift	90° ±0.5°
Reference signal	Amplitude (with 120 Ω termination)	0.8 V _{pp} to 1.2 V _{pp}
	Position	45°
	Width	22.5° for AV output 360° ±180° for AS* output
Termination	Z ₀ = 120 Ω between associated outputs	
Cable length **	Max. 50 m	

Timing diagram

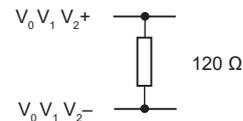


* AS output type is compatible with controllers (eg. Siemens, Fanuc) with 1 V_{pp} encoder inputs.

AS output type has limitations in sensing distance (ride height), lateral offset and roll (see page 3).

** Please consider voltage drop over cable.

Recommended signal termination



Connections

Function	Signal	Colour (option F)	15 pin D type plug (option L)	9 pin D type plug (option A)	9 pin D type plug (option P)
Power	5 V	Brown	4	5	5
	0 V	White	12	9	1
Analogue signals	V ₁	Green	9	4	2
	V ₁ -	Yellow	1	8	6
	V ₂	Blue	10	3	4
	V ₂ -	Red	2	7	8
Reference signals	V ₀	Pink	3	2	3
	V ₀ -	Grey	11	6	7
Shield	Inner	-	15	1	9
	Outer	-	Case	Case	Case

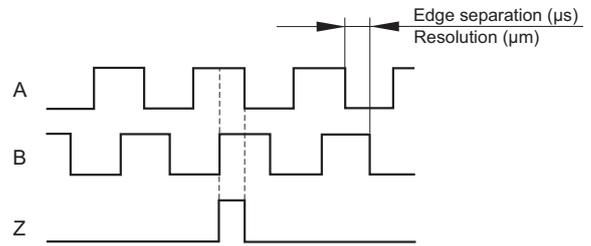
LM15IA – Incremental, push-pull; 24 V power supply

Power supply *	4.7 V to 30 V – voltage on readhead Without reverse polarity protection
Power consumption	< 35 mA
Voltage drop over cable	~ 13 mV/m – without load ~ 54 mV/m – with 120 Ω load
Response time **	< 100 ms < 10 μs (special option 02)
Output signals	3 square-wave signals A, B, Z and their inverted signals A–, B–, Z–
Reference signal	1 or more square-wave pulse Z and its inverted pulse Z–
Signal level	For 30 V: $U_H \geq 29.2 \text{ V}$ at $-I_H = 30 \text{ mA}$ $U_L \leq 0.5 \text{ V}$ at $I_L = 30 \text{ mA}$ For 5 V: $U_H \geq 4.2 \text{ V}$ at $-I_H = 20 \text{ mA}$ $U_L \leq 0.5 \text{ V}$ at $I_L = 20 \text{ mA}$
Permissible load	$I_L \leq 50 \text{ mA}$ max. load per output Outputs are protected against short circuit to 0 V and to +5 V
Alarm	High impedance on output lines A, B, A–, B– Special option 02: Alarm is not signalled by high impedance state ** Special option 07: Alarm signal is output parallel as line driver signal
Switching time (10 to 90 %)	For 24 V: $t_+ = t_- < 380 \text{ ns}$ (typ. 120 ns) For 5 V: $t_+ = t_- < 200 \text{ ns}$ (typ. 42 ns) Measured at $C_{LOAD} = 1000 \text{ pF}$
Cable length *	Max. 100 m

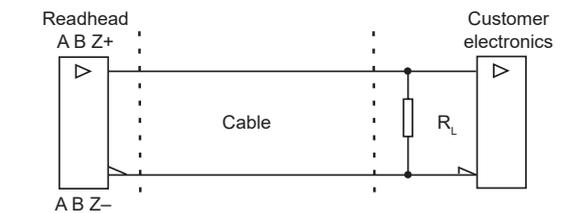
* If power supply voltage is <10 V, please consider voltage drop over cable.
** See description on page 10.

Timing diagram

Complementary signals not shown



Recommended signal termination



V_{supply}	R_L	I_{load}
5 V	250 Ω	20 mA
30 V	1 kΩ	30 mA

Connections

Function	Signal	Colour (option F)	15 pin D type plug (option D)	9 pin D type plug (option A)	15 pin HD type plug (option H)	7 pin DIN EN60130-9 plug (option U)
Power	5 V	Brown	7	5	7	5
	0 V	White	2	9	2	1
Incremental signals	A	Green	14	4	14	3
	A–	Yellow	6	8	6	-
	B	Blue	13	3	13	4
	B–	Red	5	7	5	-
Reference signals	Z	Pink	12	2	12	6
	Z–	Grey	4	6	4	-
Alarm	E	Violet	11	-	11	-
	E–	Black	3	-	3	-
Shield	Inner	-	15	1	15	-
	Outer	-	Case	Case	Case	Case

LM15IB – Digital output signals, Open Collector NPN

Square wave output

Power supply	5 V to 30 V Without reverse polarity protection
Power consumption	< 35 mA
Voltage drop over cable	~ 13 mV/m – without load ~ 54 mV/m – with 120 Ω load
Output signals	A, B, Z
Reference signal	1 or more square-wave pulses Z
Maximum load	10 mA
Cable length	See table below

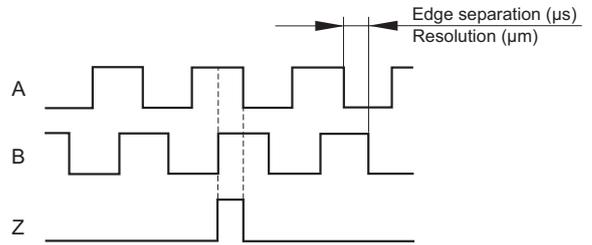
Power supply voltage	Maximum cable length ** (m)			
	5 V	12 V	24 V	30 V
Edge separation (μs)				
0.07	0.2	0.3	1	1.5
0.12	3	2.5	1	1
0.5	10	7	4	3
1	10	10	9	6
2, 4, 5, 10, 20	10	10	10	10
R_L (Ω) *	500	1200	2400	3000

* Recommended values. For higher values of R_L shorter cables should be used.

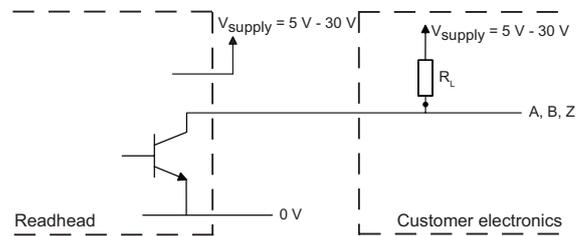
** Encoder cable length and all other cable extensions should be taken into account.

Set-up LED is flashing red in the case of poor signal strength (see table Status LED on page 10)..

Timing diagram



Recommended signal termination



Connections

Function	Signal	Colour (option F)	9 pin D type plug (option A)	7 pin DIN EN60130-9 plug (option U)
				
Power	5 V	Brown	5	5
	0 V	White	9	1
Incremental signals	A	Green	4	3
	B	Blue	3	4
Reference signal	Z	Pink	2	6
Shield	Inner	-	1	-
	Outer	-	Case	Case

LM15IC – Digital output signals, RS422

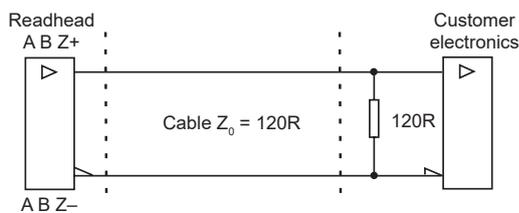
Square wave differential line driver to RS422

Power supply *	4.7 V to 7 V – voltage on readhead Reverse polarity protection
Power consumption	< 35 mA
Voltage drop over cable	~ 13 mV/m – without load ~ 54 mV/m – with 120 Ω load
Power supply rise time	< 1 ms (for PRG option only)
Response time **	< 100 ms < 10 μs (special option 02)
Output signals	3 square-wave signals A, B, Z and their inverted signals A–, B–, Z–
Reference signal	1 or more square-wave pulse Z and its inverted pulse Z–
Signal level	Differential line driver to EIA standard RS422: $U_H \geq 2.5 \text{ V}$ at $-I_H = 20 \text{ mA}$ $U_L \leq 0.5 \text{ V}$ at $I_L = 20 \text{ mA}$

Permissible load	$Z_0 \geq 100 \Omega$ between associated outputs $I_L \leq 20 \text{ mA}$ max. load per output Capacitive load $\leq 1000 \text{ pF}$ Outputs are protected against short circuit to 0 V and to +5 V Only one output shorted at a time
Alarm	High impedance on output lines A, B, A–, B– Special option 02: Alarm is not signalled by high impedance state ** Special option 07: Alarm signal is output parallel as line driver signal
Switching time (10 to 90 %)	t_+ , $t_- < 30 \text{ ns}$ (with 1 m cable and recommended input circuit)
Cable length *	Max. 100 m

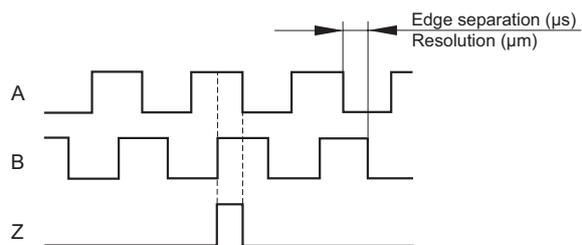
* Please consider voltage drop over cable.
** See description on page 10.

Recommended signal termination



Timing diagram

Complementary signals not shown



Connections

Function	Signal	Colour (option F)	15 pin D type plug (option D)	9 pin D type plug (option A)	15 pin HD type plug (option H)	7 pin DIN EN60130-9 plug (option U)
Power	5 V	Brown	7	5	7	5
	0 V	White	2	9	2	1
Incremental signals	A	Green	14	4	14	3
	A–	Yellow	6	8	6	-
	B	Blue	13	3	13	4
	B–	Red	5	7	5	-
Reference signals	Z	Pink	12	2	12	6
	Z–	Grey	4	6	4	-
Alarm	E	Violet	11	-	11	-
	E–	Black	3	-	3	-
Shield	Inner	-	15	1	15	-
	Outer	-	Case	Case	Case	Case

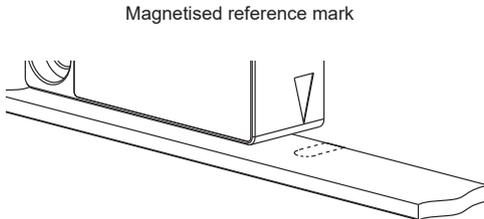
Programming (for IC output only)

Readheads can be ordered preset to the required resolution or provided so that they can be programmed as needed on the machine to the chosen resolution. This programming is carried out by connecting the readhead to a computer via a programming interface. The readhead must be ordered with the PRG resolution option to use this function. For more information on the programming function of LM15 readheads, please refer to the UPRG01 programming interface datasheet on www.rls.si/uprg01.

Reference mark

Reference marks can be provided in 2 ways:

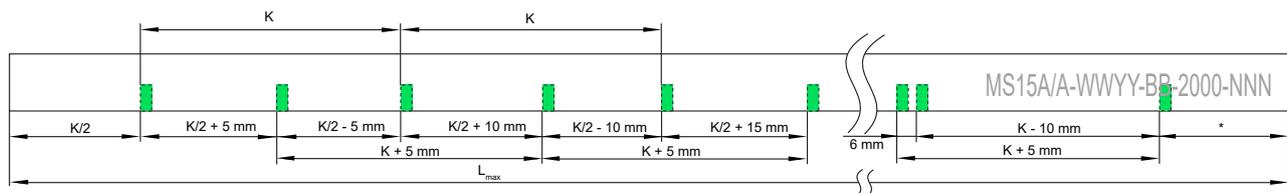
- 1) **Selected at point of order.** The LM15 readhead should be ordered with reference mark option A. Magnetic scale or ring should be ordered with reference mark. For magnetic scales used with AS output an additional letter M should be added to the end of the scale part numbering. If required, the cover foil can be installed over reference marks.



NOTE: The shape and position of the magnetised reference are critical so these options are only available as factory order.

- 2) **Periodic reference impulse. Every 5 mm.** The LM15 readhead should be ordered with reference mark option C. Magnetic scale or ring should be ordered with **no** reference mark. Position information is output in incremental quadrature format with periodic reference impulses. Reference periods correspond to pole length of magnetisation.

Distance coded reference marks. The LM15 readhead should be ordered with reference mark option A. The distance coded reference mark option provides multiple reference marks that are individually spaced according to specific mathematical algorithm. Absolute position is calculated after traversing 2 successive reference marks. Maximum length and minimum traverse depend on basic spacing (K) between reference marks, which is customer selectable at point of order. For further information please refer to Distance coded reference mark data sheet LM10D17 on www.rls.si/dcrm.



* Depends on magnetic scale length.

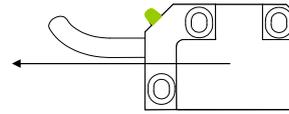
Multiple reference marks. For reference marks on multiple locations on the MS magnetic scale please [contact RLS](#) for a special part numbering.

For radial and axial ring references refer to [magnetic ring data sheet](#).

Positive direction

Digital output signals – A leads B

Analogue output signals ($1 V_{pp}$) – V_1 leads V_2



Status LED

After the installation of the magnetic scale or ring (see [MS magnetic scale installation guide for LM10 and LM15 readheads](#)) the readhead can be easily adjusted on the machine using the set-up LED indicator. When special option 07 (additional alarm outputs) is selected status of LED is available also by additional lines (HI = green LED, LO = red LED).

LED	Status	Possible reason
Green	Good signal strength/set-up	-
Red	Poor signal strength - adjustment required A, B, A-, B- become high impedance	Incorrect readhead orientation. Readhead installation out of tolerance.
Red/green flashing	IB, IC_02, IA_02: poor signal strength	Demagnetisation of measuring scale or ring. Insufficient power supply voltage.

Response time

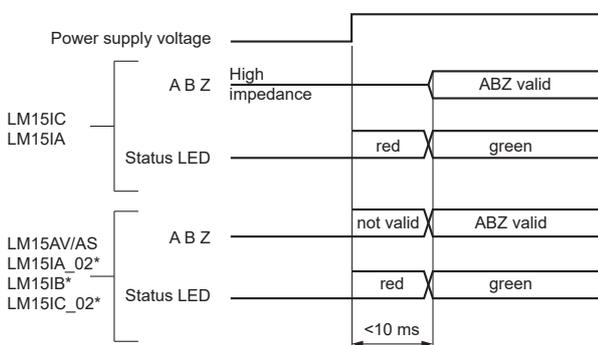
	LM15AV/AS	LM15IA_02	LM15IB	LM15IC_02	LM15IC	LM15IA
Set-up time	10 ms					
Conversion time	<250 ns					
Transition time	<10 μ s				<100 ms	

Set-up time is the time needed for the encoder readhead to start reading the position information after power-on (see diagram 1).

Conversion time is the time needed for the encoder readhead to convert the position information into an output signal.

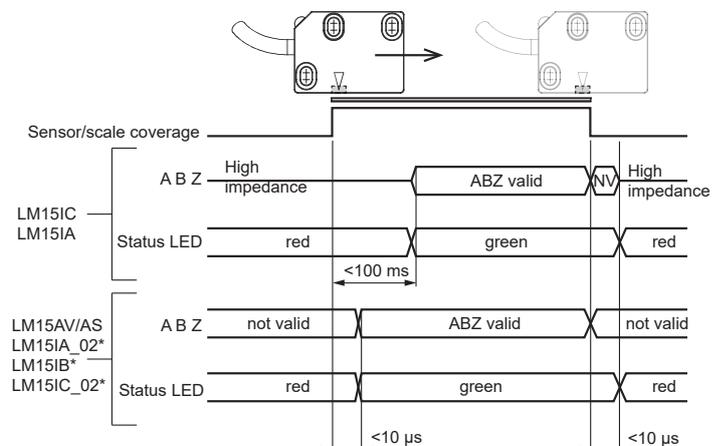
Transition time is the time it takes the encoder readhead to switch from an alarm state to a valid output signal (see diagram 2).

Diagram 1: Set-up time



* In alarm state LED flashes red/green.

Diagram 2: Transition time



Readhead part numbering



LM15 system

=



LM15 readhead
eg. LM15ICD20CA10F00

+



Magnetic scale / ring
eg. MS15BM100A0000 for scale /
MR047B040B030B00 for ring

LM15 IC D20 C A 10 F 00

Output type

AS - Analogue voltage $1V_{pp}$, wide reference pulse, 5 V⁶
AV - Analogue voltage, $1V_{pp}$; 5 V
IA - Incremental Push-Pull outputs; 5 V – 30 V
IB - Incremental, Open Collector NPN; 5 V – 30 V
IC - Incremental, RS422; 5 V

Resolution / Counts

For **AS** and **AV**: **000** - N/A
 For **IA**, **IB** and **IC**:
13B - 8192 **09B** - 512 **D10** - 100 (50 μ m)
12B - 4096 **D50** - 500 **D08** - 80
11B - 2048 **D40** - 400 (12.5 μ m) **06B** - 64
2D0 - 2000 (2.5 μ m) **D32** - 320 **D04** - 40 (125 μ m)
1D6 - 1600 **08B** - 256 **05B** - 32
10B - 1024 **D20** - 200 (25 μ m) **04B** - 16
1D0 - 1000 (5 μ m) **D16** - 160 **03B** - 8 (625 μ m)
D80 - 800 **07B** - 128
PRG - Programmable, preset to 5 μ m (for **IC** only)

For resolutions in μ m see table on page 4.

Minimum edge separation

For **AS** and **AV**: **A** - N/A
 For **IA**, **IB** and **IC**:
K - 0.07 μ s (15 MHz)¹
A - 0.12 μ s (8 MHz)²
B - 0.5 μ s (2 MHz)
C - 1 μ s (1 MHz)
D - 2 μ s (0.5 MHz)
E - 4 μ s (0.25 MHz)
F - 5 μ s (0.2 MHz)
G - 10 μ s (0.1 MHz)
H - 20 μ s (0.05 MHz)

Special requirements

00 - No special requirements (standard)
02 - Shortened reaction time (for **IA**, **IC**; not available for **PRG** type)
07 - Additional alarm output (for **IA**, **IC**; not available for **PRG** type)
10 - Not potted, protected to IP50
19 - Stainless steel housing
40 - Protective stainless-steel tube for cable
0M - Cable length in meters

Connector option

A - 9 pin D type plug⁵
D - 15 pin D type plug (for **IA** and **IC**)
F - Flying lead (no connector)³
H - 15 pin HD type plug (for **IA** and **IC**)
L - 15 pin D type plug (for **AV** and **AS**)
P - 9 pin D type plug (for **AV** and **AS**)
U - 7 pin DIN EN60130-9 plug (for **IA** and **IC**)⁵

Cable length

10 - 1.0 m (standard)
 (eg. 13 - 1.3 m cable and
 13 - 13 m cable if special option **0M** is chosen)

Reference

A - With reference sensor¹
B - No reference sensor⁴
C - Periodic reference impulse as per scale pitch (every 5 mm)⁴

¹ Not available with 03B and 04B interpolation factors.
² Default for **PRG** option; not available with 03B interpolation factor.
³ The **PRG** option comes with a plastic connector.
⁴ Not available with **AS** output type.
⁵ Not available with special option 07.
⁶ Magnetic scale must be ordered with magnetised reference mark.

Formula for linear application resolution

$$\text{Resolution } (\mu\text{m}) = \frac{2000}{\text{Interpolation}}$$

Formula for rotary application resolution

$$\text{Resolution (ppr)} = \frac{\text{cpr}}{4}$$

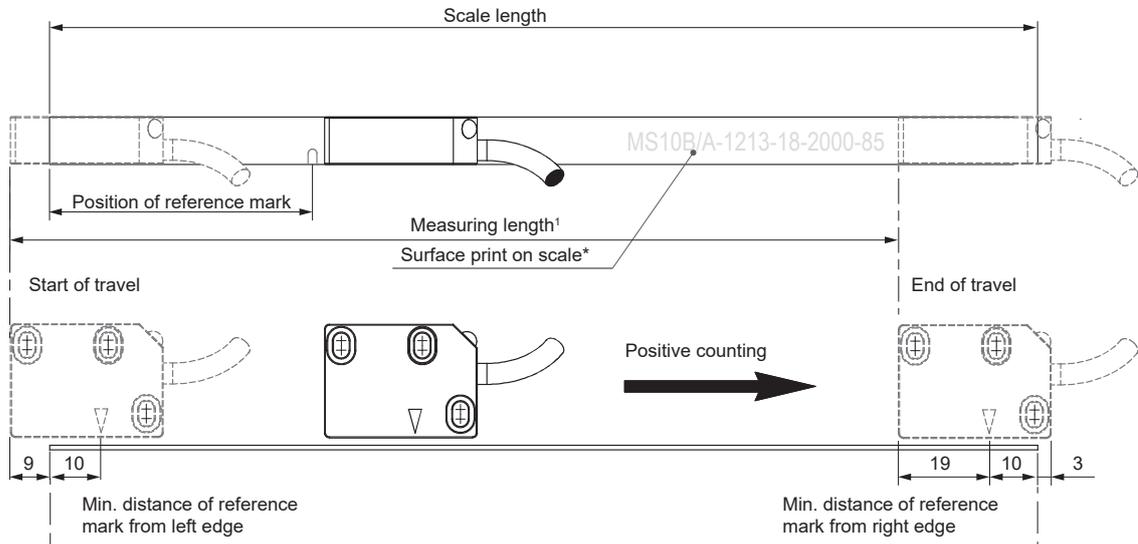
$$\text{Resolution (cpr)} = \text{Pole number} \times \text{Interpolation}$$

For radial and axial ring part numbering refer to [magnetic ring data sheet](#).

Series	Output type	Interpolation factor	Minimum edge separation	Reference	Cable length	Connector option	Special requirements	
LM15	IC	PRG	A	A/C B	10	A/D/H/F/U	00 / 10 / 0M / 02 / 07 / 19 / 40	
		xxx*	K/A/B/C/D/ E/F/G/H	A/C B				
		04B	A/B/C/D/E/ F/G/H	C B				
		03B	B/C/D/E/F /G/H	C B				
		IA	xxx*	K/A/B/C/D/ E/F/G/H				A/C B
			04B	A/B/C/D/E/ F/G/H				C B
	03B		B/C/D/E/F /G/H	C B				
	IB	xxx*	K/A/B/C/D/ E/F/G/H	A/C B		A/F/U	00 / 10 / 0M / 19 / 40	
		04B	A/B/C/D/E/ F/G/H	C B				
		03B	B/C/D/E/F /G/H	C B				
	AV	000	A	A/C B		A/L/P/F		
	AS			A				

Diagram for magnetic scale ordering

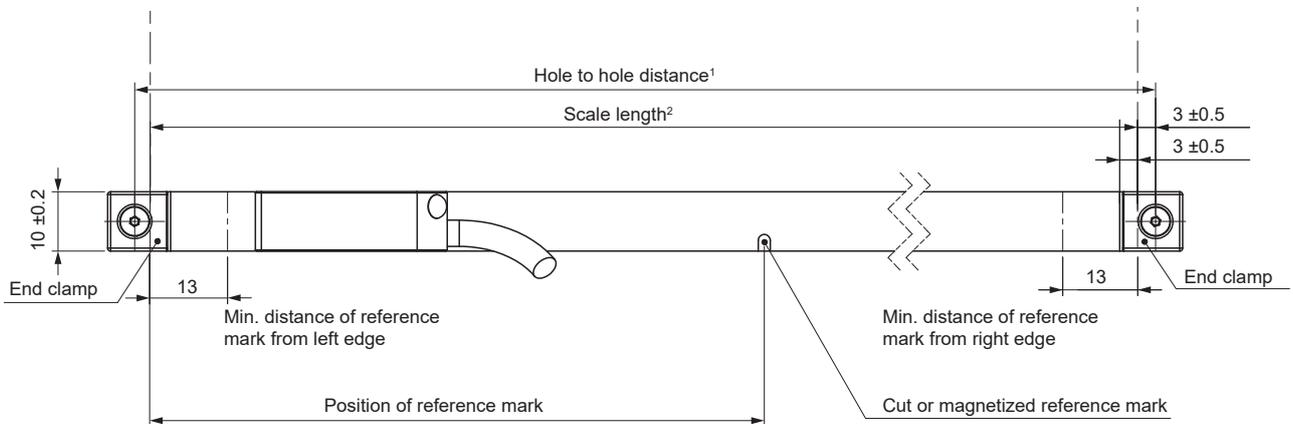
Dimensions in mm.



¹ Measuring length = Scale length - 20 mm

* Scale markings are shown for orientation purpose only. The markings do not represent the actual part numbering.

Magnetic scale with ends prepared for end clamping (options C and P)

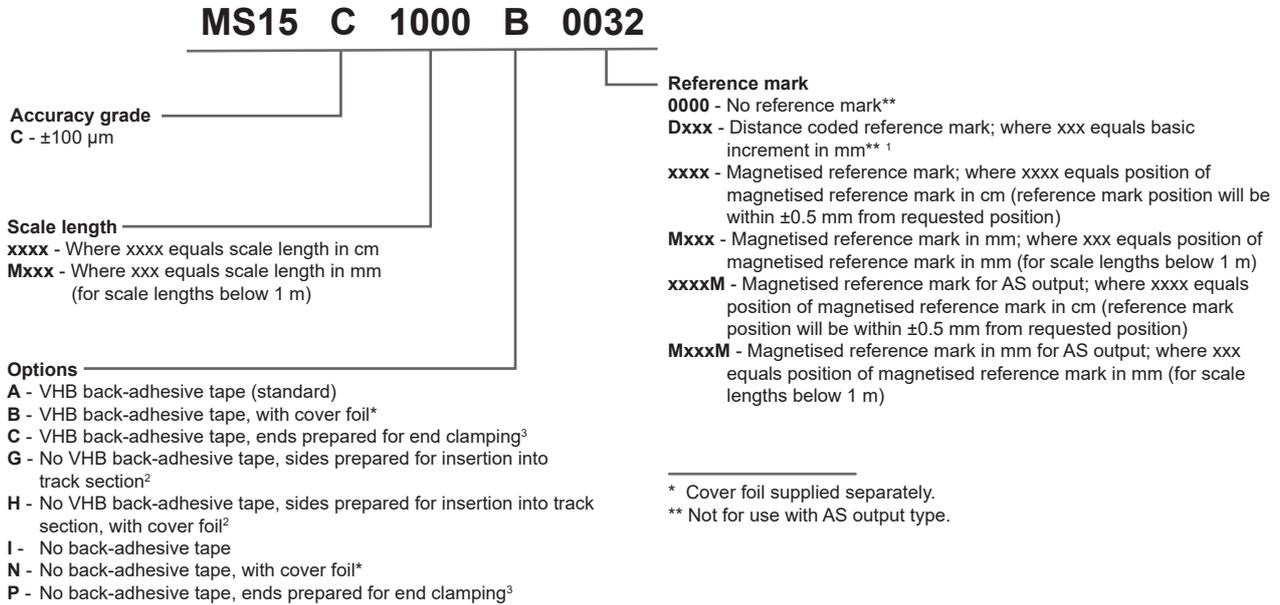


¹ Hole to hole distance = Scale length + 6 ± 1 mm (for end clamp mounting)

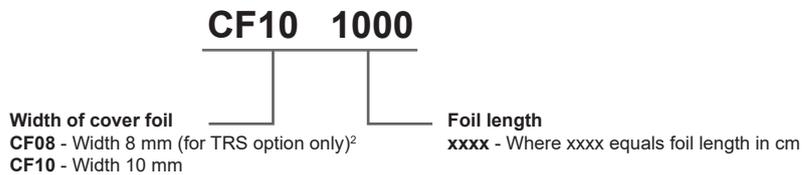
² Measuring length with end clamps = Scale length - 26 mm

Magnetic scale part numbering

Please refer to diagram for magnetic scale on page 13.



Cover foil part numbering



¹ For details on DCRM system please refer to data sheet LM10D17 on www.rls.si/lm10.

² For details on TRS system please refer to data sheet LM10D18 on www.rls.si/lm10.

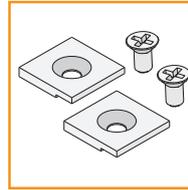
³ For details on end clamp installation please refer to data sheet LM10D14 on www.rls.si/lm10.

For radial and axial ring part numbering refer to [magnetic ring data sheet](#).

Accessories part numbering



Applicator tool for magnetic scale and cover foil
LM10ASC00



End clamp kit
(2 clamps + 2 screws)
LM10ECL00



USB encoder interface
E201



Magnet viewer
MM0001

Accessories for MS Track System



Track section, 1.00 m
TRS100A00



Track section, 2.00 m
TRS200A00



Scale clamp, 0.04 m
TRE004A00



Joining element, 0.04 m
TRE004A01



Screw and washer
TRC00

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Document issues

Issue	Date	Page	Corrections made
4	16. 5. 2018	1, 2, 4, 11-13	Ring reference added
		3, 4, 5	Cable specifications amended
		8	9-pin CPC connector added
		11, 12	Readhead part numbering amended
		13	Magnetic scale part numbering amended

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