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Cables for FORTiS™ absolute encoders

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Contents

Introduction

Renishaw offers a range of cables for use with the FORTiS™ absolute linear encoder. The cables are offered to fit a variety of applications, with cable runs falling into three categories:

1. **Readhead cables**
Uninterrupted cables that run from the FORTiS connector to plug directly into the drive/controller. For details on cable length limitations see “Maximum readhead cable length (no extension cable)” on page 9.

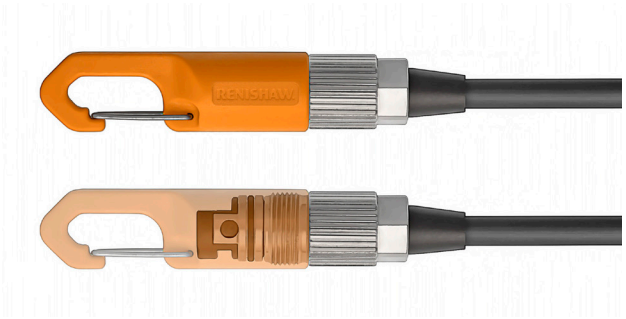
2. **Extension cables**
For use with shorter readhead cables to extend the maximum cable length. For details on cable length limitations see “Maximum readhead and extension cable length” on page 9.

3. **ADTa-100 cables**
The optional Advanced Diagnostic Tool (ADTa-100), in conjunction with the ADT View software, provides comprehensive, real-time feedback from the FORTiS encoder. It can be connected directly to the encoder, or to the interconnector, or to the plug at the drive/controller. The ADTa-100 is fitted with a 9-way female D-type input connector.
See “ADTa-100 adaptor cables” on page 32 for adaptor cable part numbers.

Renishaw FORTiS connector

The readhead connector (R termination) that plugs directly into the FORTiS encoder is a bespoke over-moulded connector made to a Renishaw design. It is supplied with an orange dust-cap with an integral clip to aid cable feed-through. The connector is not available as a field-wireable part. However, for custom applications, cables are available with the FORTiS connector (R termination) at one end and flying leads at the other; see the relevant protocol section for the part numbers.

A pack of 10 spare dust-caps is available to order: Renishaw part no. A-9768-2255.

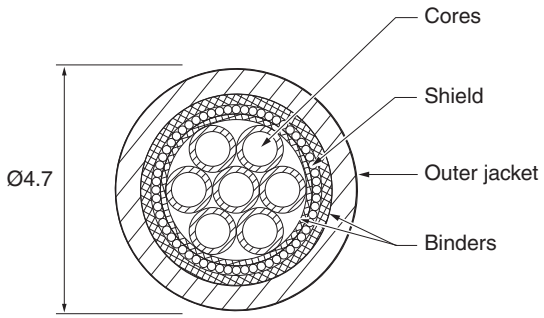


Cable types

Renishaw offers four cable types for FORTiS depending upon the requirements of the application. All cables are designed to provide toughness, excellent EMI immunity and long-term reliability in the harshest industrial conditions.

Cable types			
Cable type	**Readhead cable**	**Extension cable**	**Details**
A	✓	✗	High flex life, 20 mm dynamic bend radius, maximum readhead cable length 9 m. Ideal for applications that require a short readhead cable combined with a longer extension cable. For more details see "Type A cable" on page 5.
B	✓	✓	High flex life, > 63 mm dynamic bend radius, maximum readhead cable length 25 m. Ideal for applications that require a long readhead cable that runs all the way to the controller or as an extension cable. For more details see "Type B cable" on page 6.
C	✗	✓	Normally used on long cable lengths over 25 m. Supplied on a reel unterminated as standard (Renishaw part number M-9553-0414). For more details see "Type C cable" on page 7.
D	✓	✗	Armoured cable, high flex life, 75 mm dynamic bend radius, maximum readhead cable length 9 m. Used in applications where the readhead cable is directly exposed to the risk of physical damage. For more details see "Type D cable" on page 8.

Type A cable (4.7 mm diameter, black)



Description

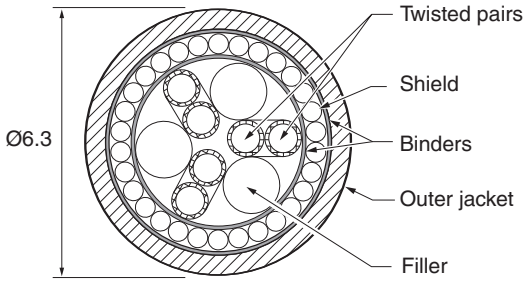
UL recognised, RoHS compatible, high-flex screened cable with 7 × 0.081 mm² (28 AWG) cores, 4.7 ±0.2 mm outside diameter. Excellent EMC properties, hydrolysis and micro-organism resistant, with low-friction surface finish.

Common applications

Use with FORTiS encoders on applications where the readhead is the moving element. Type A cable provides high flex life and low bending force. Often used in applications that require a short readhead cable combined with a longer extension cable.

Specifications	
Physical characteristics	
Outer jacket material	Black extruded polyurethane PUR (halogen free)
Usable in drag chains	Yes
Shield	Tinned and annealed copper wire, 40 AWG, to ASTM B33, optical coverage > 96% ±3%, nominal 40° braid angle
Flex life	> 20 × 10^6 cycles at 20 mm bend radius
Static bend radius	10 mm at 90° (internal radius), 15 mm at 180° (internal radius)
Dynamic bend radius	20 mm (to centre of cable)
Mass	26 kg/km
Operating temperature	–40 °C to +80 °C (UL rating)
Electrical characteristics	
Number of cores and conductor size	7 off 0.081 mm² (28 AWG)
Conductor material	Multi-strand, tinned and annealed copper wire
Voltage rating	30 V RMS
Conductor resistance at 20 °C	< 220 ohms/km
Shield resistance at 20 °C	< 50 ohms/km
Insulation resistance at 20 °C	> 10 000 megohms/km (with 500 Vdc)
Insulation breakdown at 20 °C (2.8 kVdc for 5 seconds)	Core to core > 2 000 V Core to screen > 1 000 V
Approvals	UL approval AWM Style 20236 80 °C 30 V RoHS approved

Type B cable (6.3 mm diameter, green)



Description

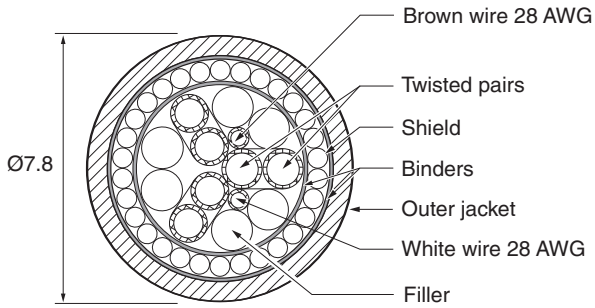
UL recognised, RoHS compatible, extra-rugged screened cable with 6 × 0.25 mm² (23 AWG) cores arranged as three twisted pairs, 6.3 ±0.2 mm outside diameter. Excellent EMC properties, hydrolysis and micro-organism resistant, with low-friction surface finish.

Common applications

Use with FORTiS encoders on applications where the scale/extrusion is the moving element. Type B cable provides high flex life, but the bending force is higher than Type A. Often used in applications that require a long readhead cable that runs all the way to the controller. Also often used as an extension cable.

Specifications	
Physical characteristics	
Outer jacket material	Green extruded polyurethane PUR (halogen free)
Usable in drag chains	Yes
Shield	Tinned and annealed copper wire, 38 AWG, to ASTM B33, optical coverage > 85%, nominal 35° braid angle
Flex life	> 20 × 10^6 cycles at 75 mm bend radius
Static bend radius	31.5 mm (internal radius)
Dynamic bend radius	> 63 mm (to centre of cable)
Mass	52 kg/km
Operating temperature	–20 °C to +80 °C (UL rating)
Electrical characteristics	
Number of cores and conductor size	3 off (2 × 0.25 mm²) (23 AWG)
Conductor material	Multi-strand, tinned and annealed copper wire
Voltage rating	30 V RMS
Conductor resistance at 20 °C	< 80 ohms/km
Shield resistance at 20 °C	< 50 ohms/km
Insulation resistance at 20 °C	> 500 megohms/km (with 500 Vdc)
Insulation breakdown at 20 °C (2.8 kVdc for 5 seconds)	Core to core > 2 000 V Core to screen > 1 000 V
Approvals	UL approval AWM Style 20554 80 °C 30 V CSA approval 75 °C – 30 V Flame resistant IEC 60332-1-2 FT2 RoHS approved

Type C cable (7.8 mm diameter, green)



Description

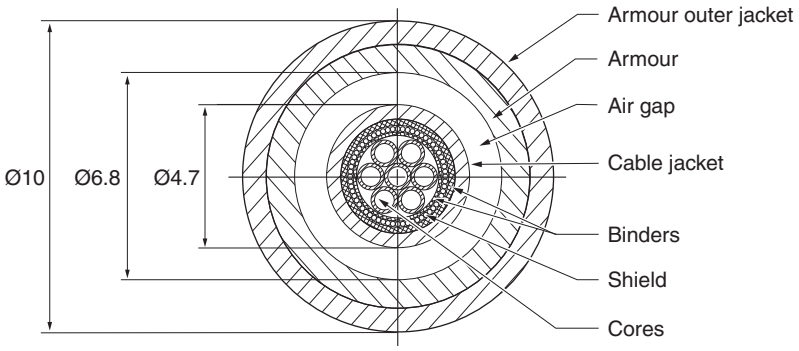
UL recognised, RoHS compatible, extra-rugged screened cable for long-length applications, with 2 off 28 AWG cores (2 × 0.08 mm²), 4 off 23 AWG cores arranged as twisted pairs (2 off (2 × 0.25 mm²)) and 2 of 20 AWG cores arranged as a twisted pair (1 off (2 × 0.5 mm²)). 7.8 ±0.3 mm outside diameter. Excellent EMC properties, hydrolysis and micro-organism resistant, with low-friction surface finish.

Common applications

Extension cable for use with FORTiS encoders on applications requiring very long cable runs. The 2 × 0.5 mm² power cores provide low voltage drop, making this cable suitable for use in cable runs up to 57 metres. It is recommended that this cable be used as an extension cable, with an interconnect to a cable with lower bend stiffness, such as Renishaw Type A cable.

Specifications	
Physical characteristics	
Outer jacket material	Green extruded polyurethane PUR (halogen free)
Usable in drag chains	Yes
Shield	Tinned and annealed copper wire, 38 AWG, to ASTM B33, optical coverage > 85%, nominal 35° braid angle
Flex life	> 20 × 10^6 cycles at 75 mm bend radius
Static bend radius	50 mm at 90° (internal radius); 58 mm at 180° (internal radius)
Dynamic bend radius	75 mm (to centre of cable)
Mass	74 kg/km
Operating temperature	–20 °C to +80 °C (UL rating)
Electrical characteristics	
Number of cores and conductor size	2 × (2 × 0.25 mm²) + 1 × (2 × 0.5 mm²) + 2 × (0.081 mm²)
Conductor material	Multi-strand, tinned and annealed copper wire
Voltage rating	30 V RMS
Conductor resistance at 20 °C	< 39 ohms/km on 0.5 mm² (20 AWG) cores < 80 ohms/km on 0.25 mm² (23 AWG) cores < 220 ohms/km on 0.081 mm² (28 AWG) cores
Shield resistance at 20 °C	< 50 ohms/km
Insulation resistance at 20 °C	> 10 000 megohms/km (with 500 Vdc) on 0.5 mm² and 0.081 mm² cores > 500 megohms/km (with 500 Vdc) on 0.25 mm² cores
Insulation breakdown at 20 °C (1 kVac for 1 minute)	Core to core > 2 000 V Core to screen > 1 000 V
Approvals	UL approval AWM Style 20554 80 °C 30V CSA approval 75 °C – 30 V Flame resistant IEC 60332-1-2 FT2 RoHS approved

Type D cable (10 mm diameter, blue)



Description

UL recognised, RoHS compatible, high-flex screened cable with 7 × 0.081 mm² (28 AWG) cores, 10 ±0.5 mm outside diameter. Excellent EMC properties, hydrolysis and micro-organism resistant, high flex life, 75 mm dynamic bend radius, maximum readhead cable length 9 m.

Common applications

Used in applications where the readhead cable is directly exposed to the risk of physical damage.

Specifications	
Physical characteristics	
Outer jacket material	UL recognised cable within galvanised steel conduit with PUR jacket
Usable in drag chains	Yes
Shield	Tinned and annealed copper wire, 40 AWG, to ASTM B33, optical coverage > 96 ±3%, nominal 40° braid angle
Flex life	> 20 × 10^6 cycles at 75 mm internal radius
Static bend radius	25 mm internal radius
Dynamic bend radius	75 mm internal radius
Mass	165 kg/km
Operating temperature	–5 °C to +70 °C (UL rating)
Crush strength at 23 °C (IEC 61386-1)	< 25% crush > 90% recovery: > 1250N
Electrical characteristics	
Number of cores and conductor size	7 off 0.081 mm² (28 AWG)
Conductor material	Multi-strand, tinned and annealed copper wire
Voltage rating	30 V RMS
Conductor resistance at 20 °C	< 220 ohms/km
Shield resistance at 20 °C	< 50 ohms/km
Insulation resistance at 20 °C	> 10 000 megohms/km (with 500 Vdc)
Insulation breakdown at 20 °C (2.8 kVac for 5 seconds)	Core to core > 2 000 V Core to screen > 1 000 V
Approvals	UL approval AWM Style 20236 80 °C 30V RoHS approved

Maximum cable lengths

Maximum readhead cable length (no extension cable)

The maximum length for a cable run consisting of only one type of cable (readhead cable direct to the controller, no extension cable used) depends upon the cable type:

- Type A cable: 9 metres
- Type B cable: 25 metres
- Type D cable: 9 metres

Maximum readhead and extension cable length

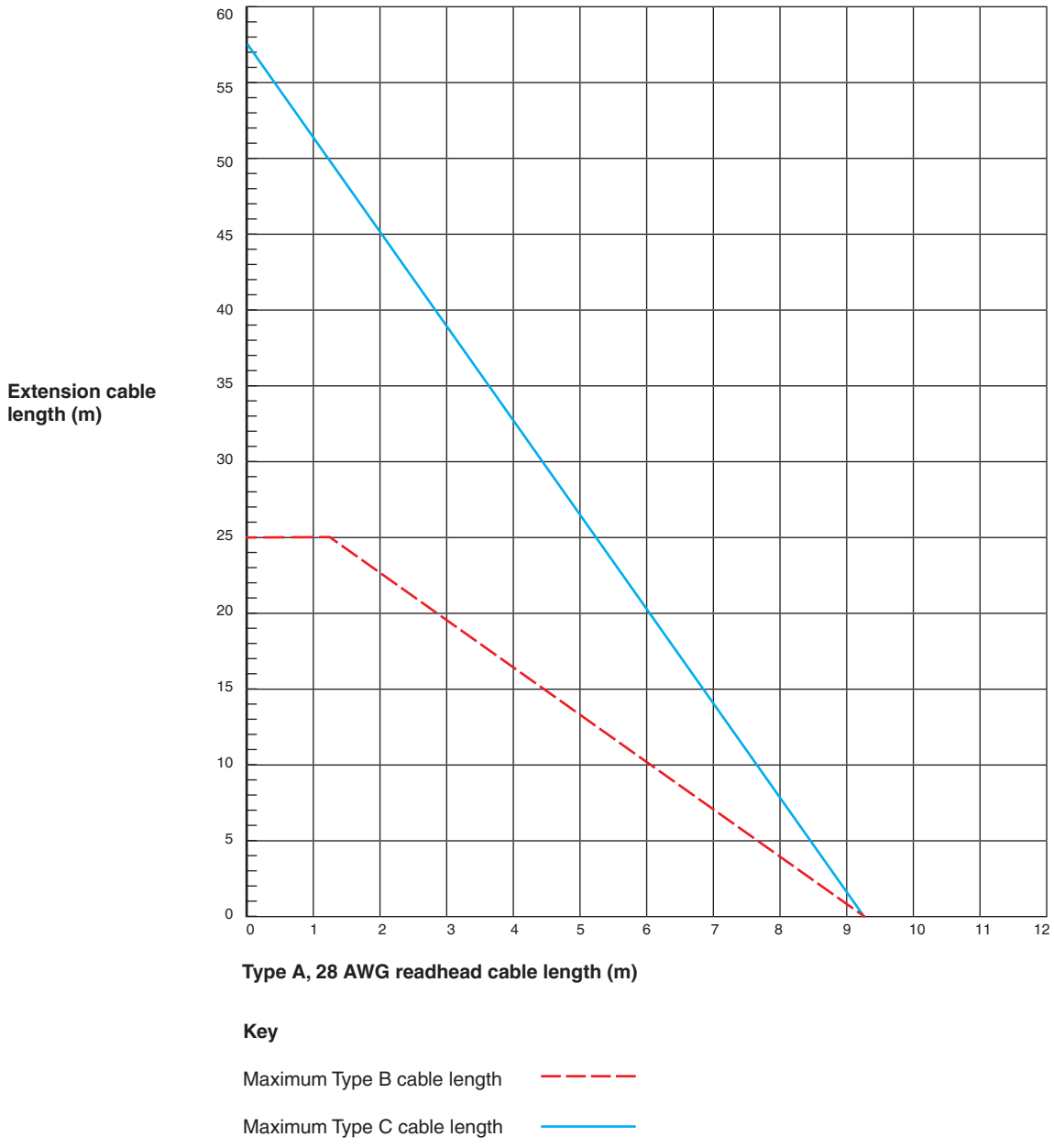
The maximum total cable length when using an extension cable depends upon several factors:

- Readhead cable type
- Readhead cable length
- Type of extension cable

To work out the maximum cable length possible for Type A readhead cables see "Type A readhead cable combined with an extension cable" on page 10, and for Type B readhead cables see "Type B readhead cable combined with an extension cable" on page 11.

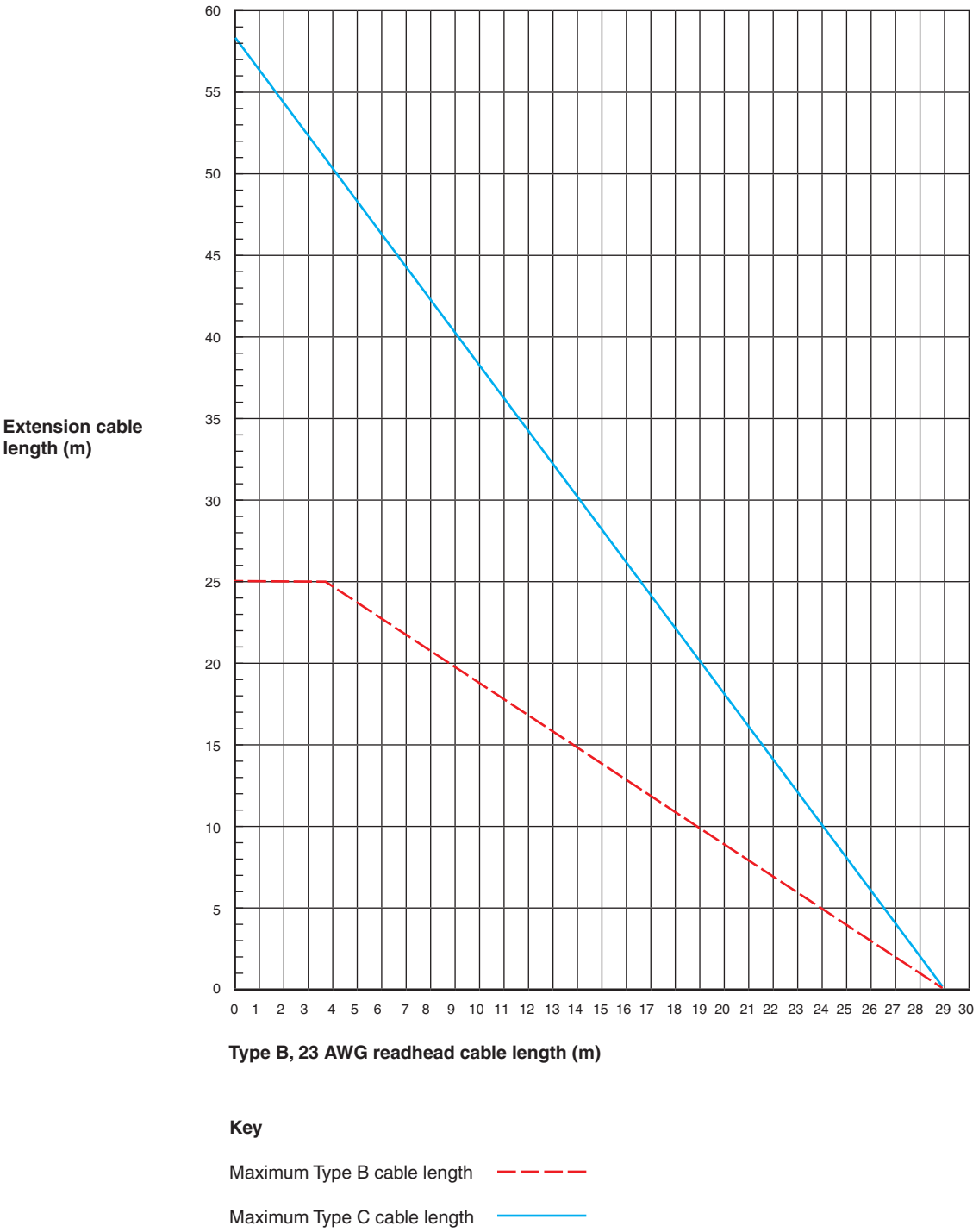
Type A readhead cable combined with an extension cable

The following graph shows the maximum length for a cable run when a combination of Type A readhead cable and either Type B or Type C extension cable is used. To read this graph, find the length of readhead cable on the *x* axis, then the *y* axis will indicate the maximum extension cable length for each type of extension cable.



Type B readhead cable combined with an extension cable

The following graph shows the maximum length for a cable run when a combination of Type B readhead cable and either Type B or Type C extension cable is used. To read this graph, find the length of readhead cable on the *x* axis, then the *y* axis will indicate the maximum extension cable length for each type of extension cable.



BiSS C and BiSS Safety

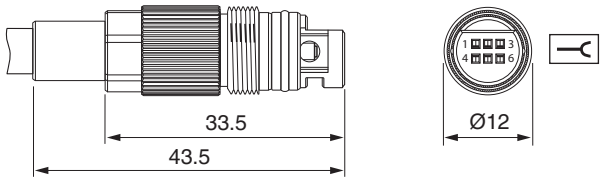
BiSS C and BiSS Safety are available with either Renishaw standard termination (see "Termination options" below) or iC-Haus termination (see "Cables with iC-Haus standard pin-out" on page 15).

Cables with Renishaw standard termination

Termination options

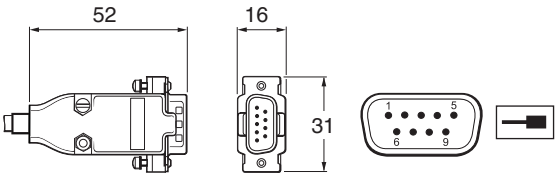
Readhead connector

Dimensions in mm

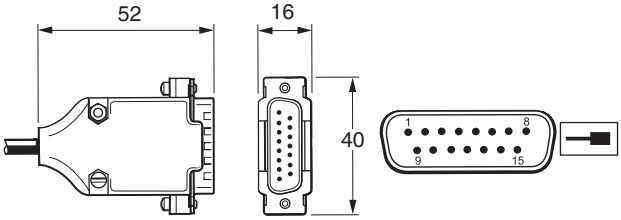


Controller connector

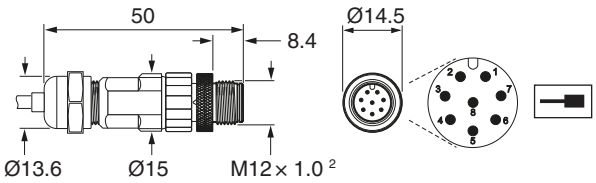
9-way D-type plug



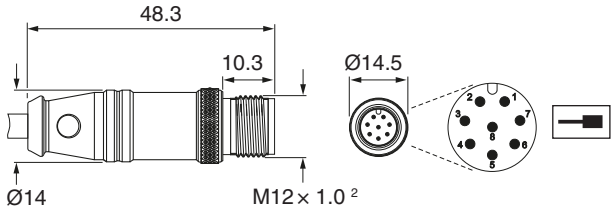
15-way D-type plug



8-way M12 plug [1]

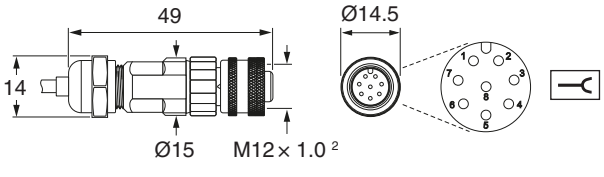


8-way M12 plug – overmoulded version

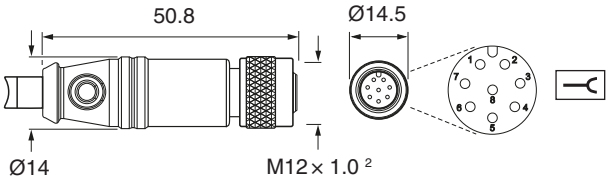


In-line connector

8-way M12 socket [1]



8-way M12 socket – overmoulded version



[1] Subject to availability, may be supplied with overmoulded version.

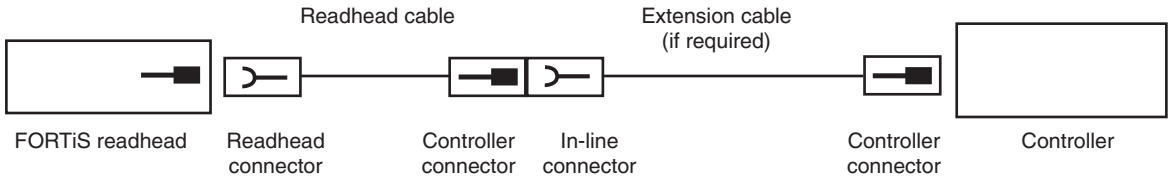
[2] The recommended tightening torque is 4 Nm.

Output signals

Function	Signal	Flying lead wire colour (F)	Pin-out		
			9-way D-type (A)	8-way M12 (S)	15-way D-type (D)
Power	5 V	Brown	4, 5	2	4, 12
	0 V	White	8, 9	5, 8	2, 10
Serial interface	MA+	Violet	2	3	8
	MA–	Yellow	3	4	15
	SLO+	Grey	6	7	5
	SLO–	Pink	7	6	13
Shield	Shield	Shield	Case	Case	Case

Nomenclature

IMPORTANT: Maximum cable length depends upon the readhead cable length and cable type. For maximum total cable lengths see page 9.



Readhead cable

A A - 0300 - R S X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable
B - 6.3 mm diameter green encoder cable
D - 10 mm diameter armoured encoder cable

Length

0050 - 0.5 m	0600 - 6 m
0100 - 1 m	0900 - 9 m
0300 - 3 m	1200 - 12 m (Cable Type B only)

Readhead connector
R - FORTiS readhead connector

Controller connector
A - 9-way D-type (Renishaw)
D - 15-way D-type (Beckhoff)
F - Flying lead
S - 8-way M12 (Renishaw) [1]

Other
X - Standard

[1] Recommended options for use with extension cables.

Extension cable

A B - 0600 - S A X

Category
A - Absolute encoder cable

Cable type
B - 6.3 mm diameter green encoder cable

Length

0100 - 1 m	1200 - 12 m
0300 - 3 m	1500 - 15 m
0600 - 6 m	2000 - 20 m

In-line connector
S - 8-way M12 (Renishaw)

Controller connector
A - 9-way D-type (Renishaw)
D - 15-way D-type (Beckhoff)
F - Flying lead
S - 8-way M12 (Renishaw)

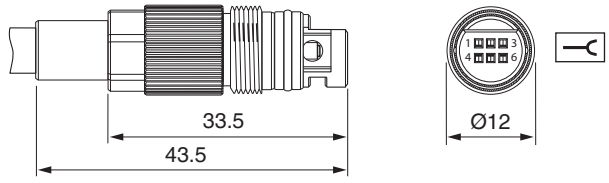
Other
X - Standard

Cables with iC-Haus standard pin-out

Termination options

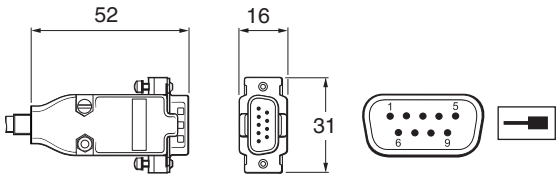
Readhead connector

Dimensions in mm

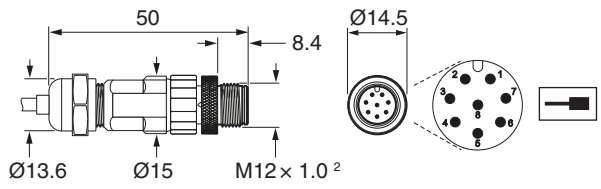


Controller connector

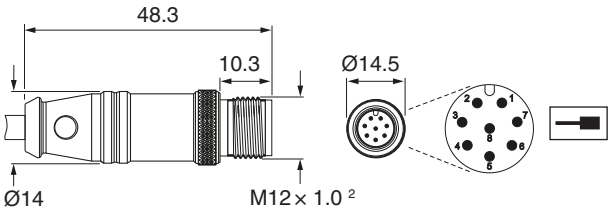
9-way D-type plug



8-way M12 plug [1]

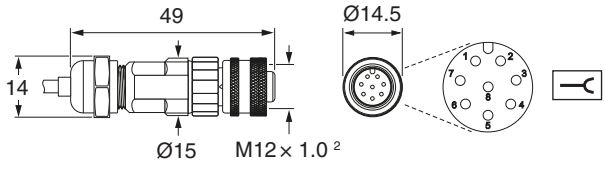


8-way M12 plug – overmoulded version

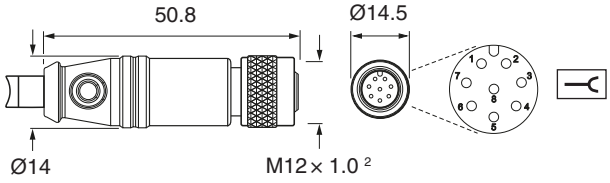


In-line connector

8-way M12 socket [1]



8-way M12 socket – overmoulded version



[1] Subject to availability, may be supplied with overmoulded version.

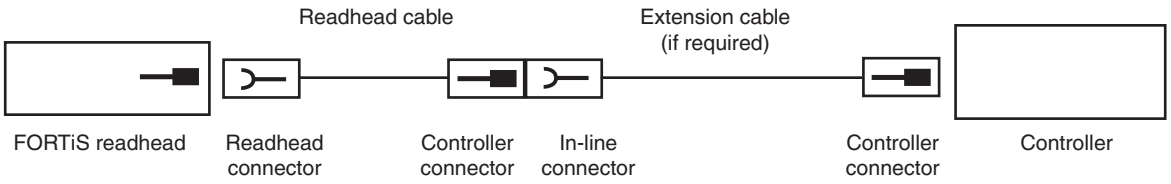
[2] The recommended tightening torque is 4 Nm.

Output signals

Function	Signal	Flying lead wire colour (F)	Pin-out	
			9-way D-type (G)	8-way M12 (U)
Power	5 V	Brown	4	1
	0 V	White	6	2
Serial interface	MA+	Violet	2	6
	MA–	Yellow	3	4
	SLO+	Grey	7	5
	SLO–	Pink	8	8
Shield	Shield	Shield	Case	Case

Nomenclature

IMPORTANT: Maximum cable length depends upon the readhead cable length and cable type. For maximum total cable lengths see page 9.



Readhead cable

A A - 0300 - R G X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable
B - 6.3 mm diameter green encoder cable
D - 10 mm diameter armoured encoder cable

Length

0050 - 0.5 m	0600 - 6 m
0100 - 1 m	0900 - 9 m
0300 - 3 m	1200 - 12 m (Cable Type B only)

Readhead connector
R - FORTiS readhead connector

Controller connector
F - Flying lead
G - 9-way D-type
U - 8-way M12 (iC-Haus) [1]

Other
X - Standard

[1] Recommended option for use with extension cables.

Extension cable

A B - 0600 - U G X

Category
A - Absolute encoder cable

Cable type
B - 6.3 mm diameter green encoder cable

Length

0100 - 1 m	1200 - 12 m
0300 - 3 m	1500 - 15 m
0600 - 6 m	2000 - 20 m

In-line connector
U - 8-way M12 (iC-Haus)

Controller connector
F - Flying lead
G - 9-way D-type

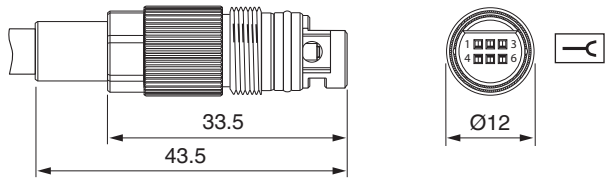
Other
X - Standard

FANUC

Termination options

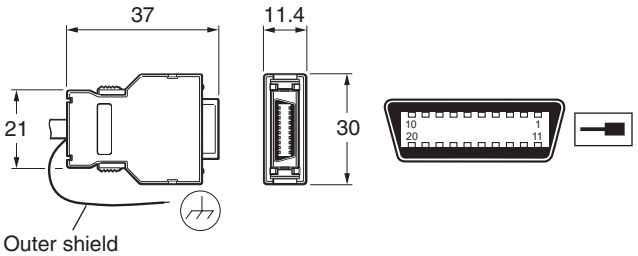
Readhead connector

Dimensions in mm

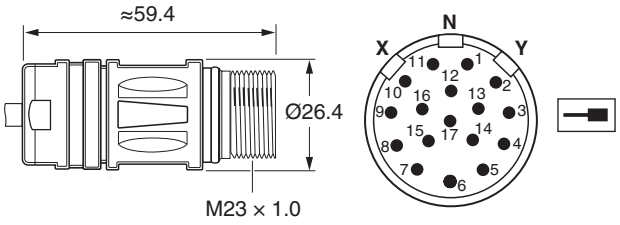


Controller connector

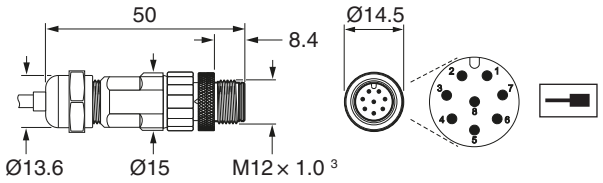
20-way plug [1]



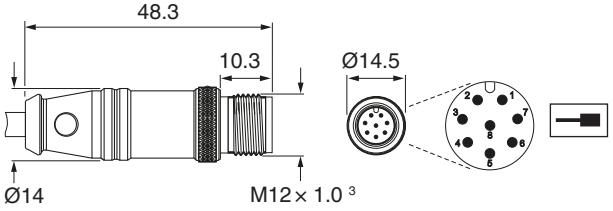
17-way M23 plug



8-way M12 plug [2]

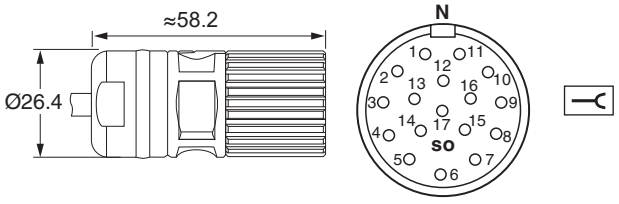


8-way M12 plug – overmoulded version

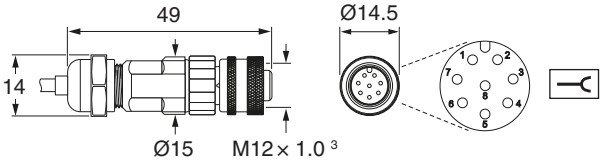


In-line connector

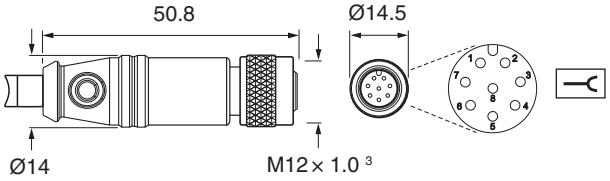
17-way M23 socket



8-way M12 socket [2]



8-way M12 socket – overmoulded version



[1] Only Fanuc-approved controller connectors are supplied. However, the cosmetic appearance of the connector supplied may differ from the illustration, depending on the approved supplier used.

[2] Subject to availability, may be supplied with overmoulded version.

[3] The recommended tightening torque is 4 Nm.

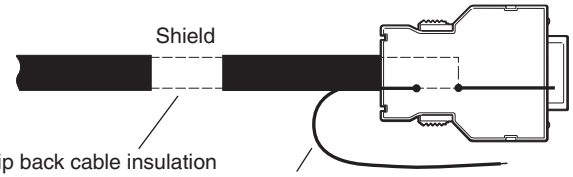
Output signals

Function	Signal		Flying lead wire colour (F)	Pin-out			
	FANUC α	FANUC αi		20-way plug (H)	8-way M12 (S)	8-way M12 (T)	17-way M23 (C)
Power	5 V	5 V	Brown	9, 20	2	8	1, 7
	0 V	0 V	White	12, 14	5, 8	5	4, 10
Serial interface	REQ+	REQ+ / SD+	Violet	5	3	7	8
	REQ–	REQ– / SD–	Yellow	6	4	6	9
	SD+	Do not connect	Grey	1	7	3	14
	SD–		Pink	2	6	4	17
Shield	Shield	Shield	Cable braid	16, External	Case	Case	Case

Connecting the cable screen on H terminations

⚠ The following arrangement should be applied to FANUC versions only.

The cable is supplied with the shield connected to pin 16 inside the connector, making the required connection to the FANUC equipment. The shield must also be connected to machine Earth, either by using the external Earth wire provided, or by cutting back the cable insulation to expose the shield and clamping that to machine Earth.

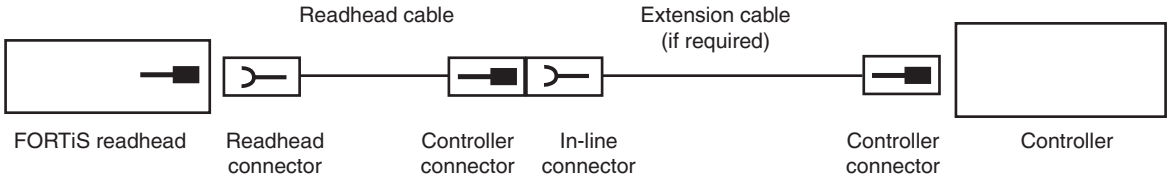


Option 2: Strip back cable insulation to expose the braided shield and clamp to machine Earth.

Option 1: Connect external Earth wire to machine Earth.

Nomenclature

IMPORTANT: Maximum cable length depends upon the readhead cable length and cable type. For maximum total cable lengths see page 9.



Readhead cable

A A - 0300 - R H X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable
B - 6.3 mm diameter green encoder cable
D - 10 mm diameter armoured encoder cable

Length

0050 - 0.5 m	0600 - 6 m
0100 - 1 m	0900 - 9 m
0300 - 3 m	1200 - 12 m (Cable Type B only)

Readhead connector
R - FORTiS readhead connector

Controller connector
C - 17-way M23 [1]
F - Flying lead
H - H-20 way Honda/Hirose (FANUC)
S - 8-way M12 (Renishaw) [1]
T - 8-way M12 (alternative pin-out) [1]

Other
X - Standard

[1] Recommended options for use with extension cables.

Extension cable

A B - 0600 - S H X

Category
A - Absolute encoder cable

Cable type
B - 6.3 mm diameter green encoder cable

Length

0100 - 1 m	1200 - 12 m
0300 - 3 m	1500 - 15 m
0600 - 6 m	2000 - 20 m

In-line connector
C - 17-way M23
S - 8-way M12 (Renishaw)
T - 8-way M12 (alternative pin-out)

Controller connector
H - 20-way Honda (FANUC)

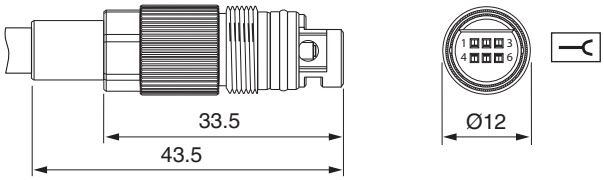
Other
X - Standard

Mitsubishi

Termination options

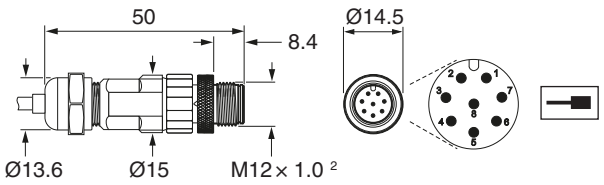
Readhead connector

Dimensions in mm

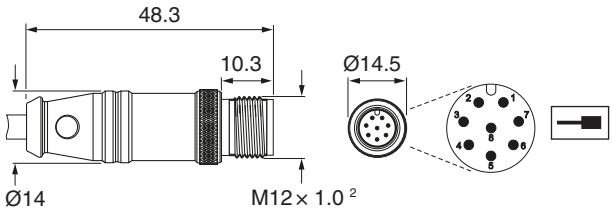


Controller connector

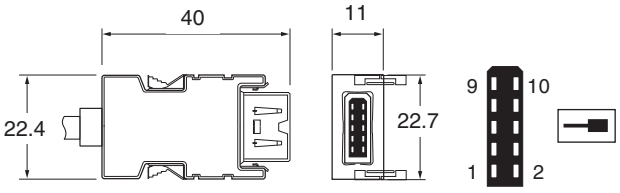
8-way M12 plug [1]



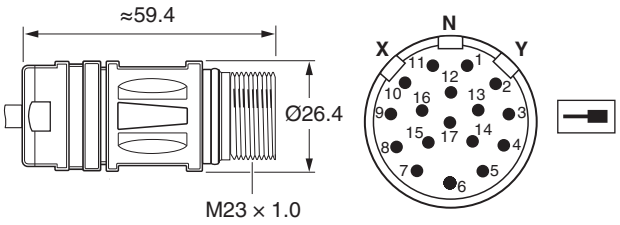
8-way M12 plug – overmoulded version



10-way plug [3]

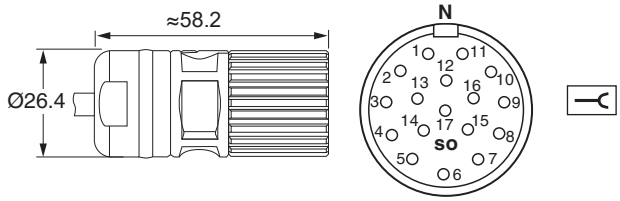


17-way M23 plug

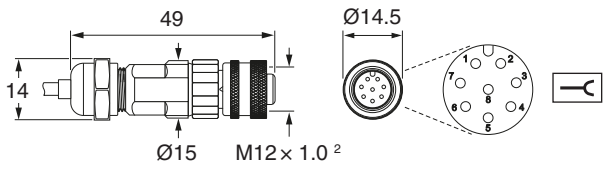


In-line connector

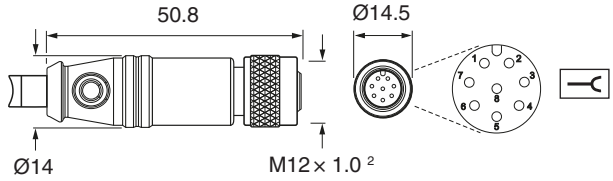
17-way M23 socket



8-way M12 socket [1]



8-way M12 socket – overmoulded version



[1] Subject to availability, may be supplied with overmoulded version.

[2] The recommended tightening torque is 4 Nm.

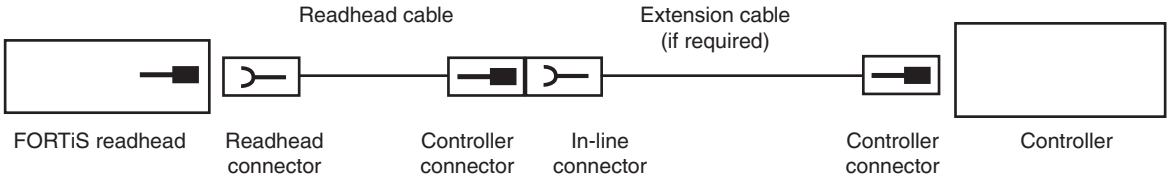
[3] Only Mitsubishi-approved controller connectors are supplied. However, the cosmetic appearance of the connector supplied may differ from the illustration, depending on the approved supplier used.

Output signals

Function	Signal	Flying lead wire colour (F)	Pin-out		
			10-way 3M (P)	8-way M12 (S)	8-way M12 (T)
Power	5 V	Brown	1	2	8
	0 V	White	2	5, 8	5
Serial interface	MR	Violet	3	3	7
	MRR	Yellow	4	4	6
	MD	Grey	7	7	3
	MDR	Pink	8	6	4
Shield	Shield	Shield	Case	Case	Case

Nomenclature

IMPORTANT: Maximum cable length depends upon the readhead cable length and cable type. For maximum total cable lengths see page 9.



Readhead cable

A A - 0300 - R P X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable
B - 6.3 mm diameter green encoder cable
D - 10 mm diameter armoured encoder cable

Length

0050 - 0.5 m	0600 - 6 m
0100 - 1 m	0900 - 9 m
0300 - 3 m	1200 - 12 m (Cable Type B only)

Readhead connector
R - FORTiS readhead connector

Controller connector
C - 17-way M23 [1]
F - Flying lead
P - 10-way 3M/Molex (Mitsubishi)
S - 8-way M12 (Renishaw) [1]
T - 8-way M12 (alternative pin-out) [1]

Other
X - Standard

[1] Recommended options for use with extension cables.

Extension cable

A B - 0600 - S P X

Category
A - Absolute encoder cable

Cable type
B - 6.3 mm diameter green encoder cable

Length

0100 - 1 m	1200 - 12 m
0300 - 3 m	1500 - 15 m
0600 - 6 m	2000 - 20 m

In-line connector
C - 17-way M23
S - 8-way M12 (Renishaw)
T - 8-way M12 (alternative pin-out)

Controller connector
P - 10-way 3M/Molex (Mitsubishi)

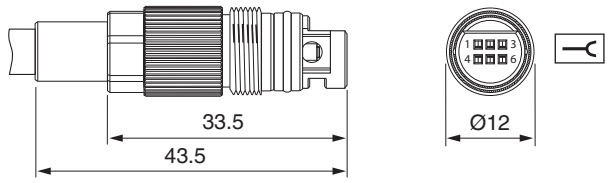
Other
X - Standard

Panasonic

Termination options

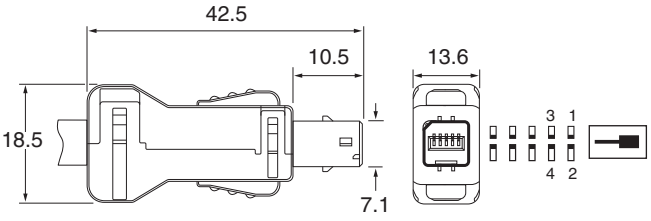
Readhead connector

Dimensions in mm

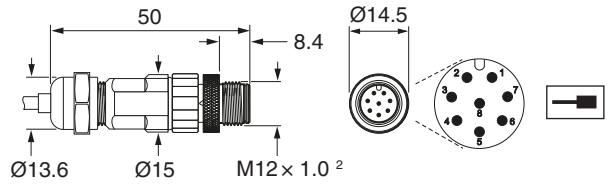


Controller connector

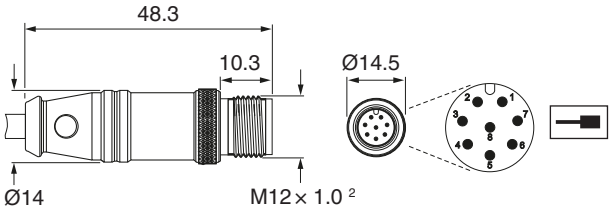
10-way plug



8-way M12 plug [1]

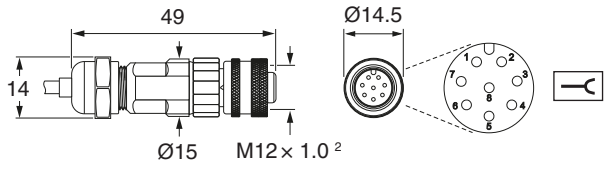


8-way M12 plug – overmoulded version

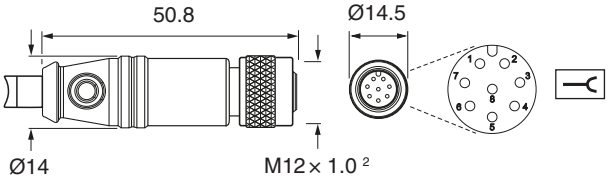


In-line connector

8-way M12 socket [1]



8-way M12 socket – overmoulded version



[1] Subject to availability, may be supplied with overmoulded version.

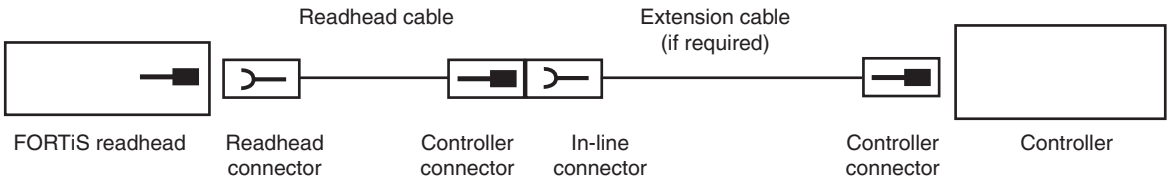
[2] The recommended tightening torque is 4 Nm.

Output signals

Function	Signal	Flying lead wire colour (F)	Pin-out	
			8-way M12 (S)	10-way (J)
Power	5 V	Brown	2	1
	0 V	White	5, 8	2
		Green		-
Serial interface	PS	Violet	3	3
	$\overline{PS}$	Yellow	4	4
Reserved	Do not connect	Grey	7	-
		Pink	6	-
Shield	Shield	Shield	Case	Case

Nomenclature

IMPORTANT: Maximum cable length depends upon the readhead cable length and cable type. For maximum total cable lengths see page 9.



Readhead cable

A A - 0300 - R S X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable
B - 6.3 mm diameter green encoder cable
D - 10 mm diameter armoured encoder cable

Length

0050 - 0.5 m	0600 - 6 m
0100 - 1 m	0900 - 9 m
0300 - 3 m	1200 - 12 m (Cable Type B only)

Readhead connector
R - FORTiS readhead connector

Controller connector
F - Flying lead
J - 10-way
S - 8-way M12 (Renishaw)

Other
X - Standard

Extension cable

A B - 0600 - S S X

Category
A - Absolute encoder cable

Cable type
B - 6.3 mm diameter green encoder cable

Length

0100 - 1 m	1200 - 12 m
0300 - 3 m	1500 - 15 m
0600 - 6 m	2000 - 20 m

In-line connector
S - 8-way M12 (Renishaw)

Controller connector
F - Flying lead
S - 8-way M12 (Renishaw)

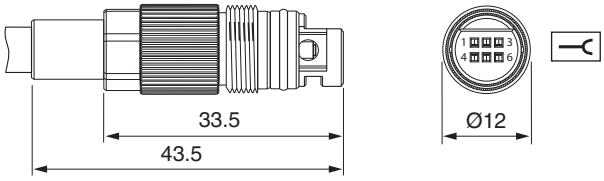
Other
X - Standard

Siemens

Termination options

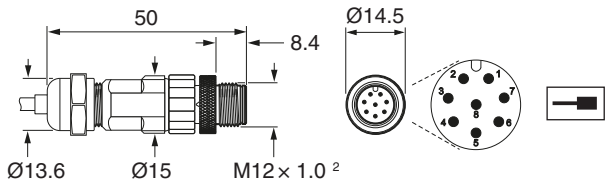
Readhead connector

Dimensions in mm

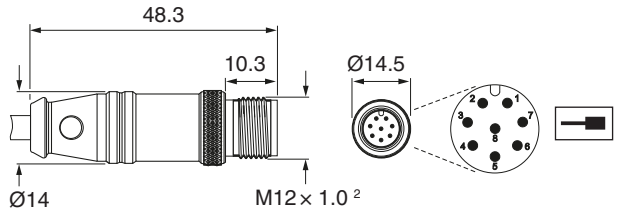


Drive-CLiQ interface connector

8-way M12 plug [1]

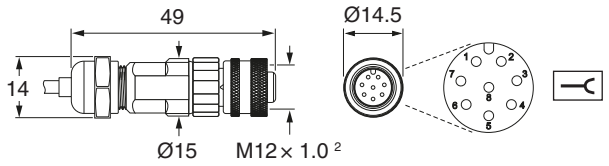


8-way M12 plug – overmoulded version

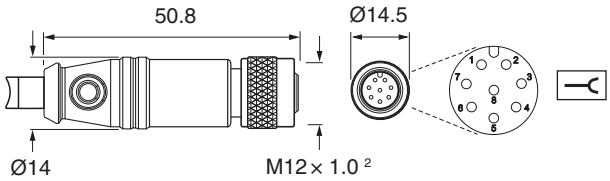


In-line connector

8-way M12 socket [1]



8-way M12 socket – overmoulded version



[1] Subject to availability, may be supplied with overmoulded version.

[2] The recommended tightening torque is 4 Nm.

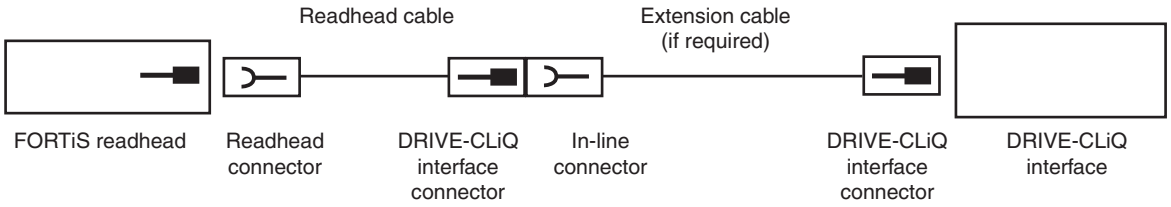
Output signals

Function	Signal	Wire colour	Pin-out
			8-way M12 (S)
Power	5 V	Brown	2
	0 V	White	5, 8
Serial interface	A+	Violet	3
	A–	Yellow	4
Reserved	Do not connect	Grey	7
		Pink	6
Shield	Shield	Shield	Case

Extension cables from the FORTiS DRIVE-CLiQ interface to controller should be sourced directly from Siemens.

Nomenclature

IMPORTANT: Maximum cable length depends upon the readhead cable length and cable type. For maximum total cable lengths see page 9.



Readhead cable

A A - 0300 - R S X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable
B - 6.3 mm diameter green encoder cable
D - 10 mm diameter armoured encoder cable

Length

0050 - 0.5 m	0600 - 6 m
0100 - 1 m	0900 - 9 m
0300 - 3 m	1200 - 12 m (Cable Type B only)

Readhead connector
R - FORTiS readhead connector

DRIVE-CLiQ interface connector
S - 8-way M12 (Renishaw)

Other
X - Standard

Extension cable

A B - 0600 - S S X

Category
A - Absolute encoder cable

Cable type
B - 6.3 mm diameter green encoder cable

Length

0100 - 1 m	1200 - 12 m
0300 - 3 m	1500 - 15 m
0600 - 6 m	2000 - 20 m

In-line connector
S - 8-way M12 (Renishaw)

DRIVE-CLiQ interface connector
S - 8-way M12 (Renishaw)

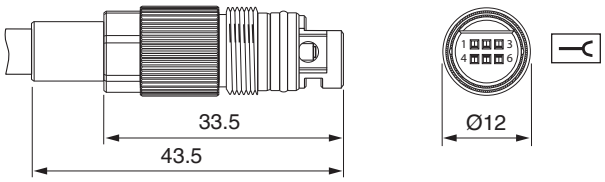
Other
X - Standard

Yaskawa

Termination options

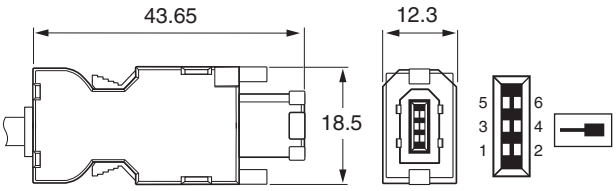
Readhead connector

Dimensions in mm

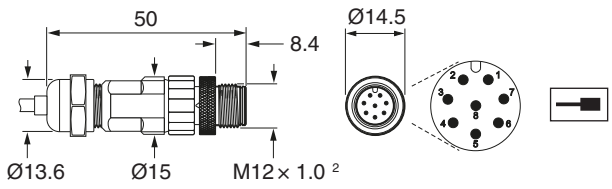


Controller connector

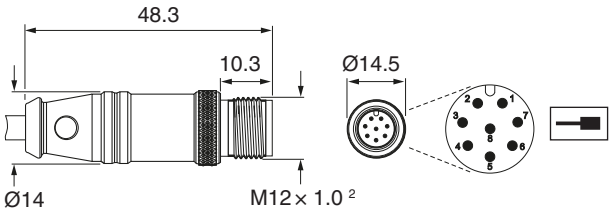
6-way plug



8-way M12 plug [1]

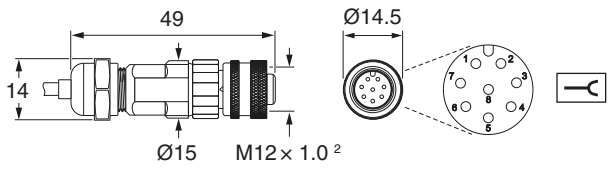


8-way M12 plug – overmoulded version

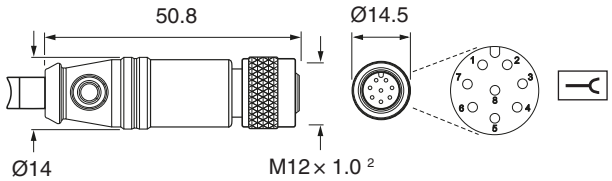


In-line connector

8-way M12 socket [1]



8-way M12 socket – overmoulded version



[1] Subject to availability, may be supplied with overmoulded version.

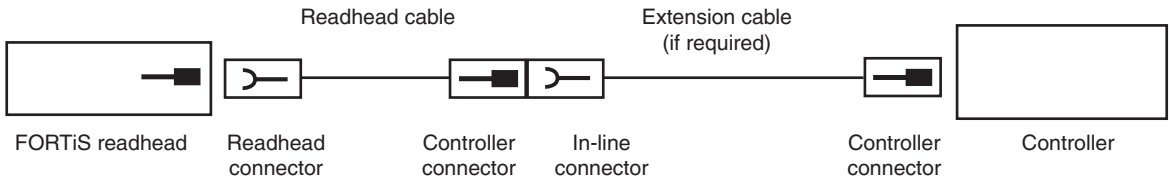
[2] The recommended tightening torque is 4 Nm.

Output signals

Function	Signal	Flying lead wire colour (F)	Pin-out	
			6-way Molex (Y)	8-way M12 (S)
Power	5 V	Brown	1	2
	0 V	White	2	5, 8
		Green	Not connected	
Serial interface	S	Violet	5	3
	$\overline{S}$	Yellow	6	4
Reserved	Do not connect	Grey	-	7
		Pink	-	6
Shield	Shield	Shield	Case	Case

Nomenclature

IMPORTANT: Maximum cable length depends upon the readhead cable length and cable type. For maximum total cable lengths see page 9.



Readhead cable

A A - 0300 - R S X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable
B - 6.3 mm diameter green encoder cable
D - 10 mm diameter armoured encoder cable

Length

0050 - 0.5 m	0600 - 6 m
0100 - 1 m	0900 - 9 m
0300 - 3 m	1200 - 12 m (Cable Type B only)

Readhead connector
R - FORTiS readhead connector

Controller connector
F - Flying lead
S - 8-way M12 (Renishaw) [1]
Y - 6-way Molex (Yaskawa)

Other
X - Standard

[1] Recommended option for use with extension cables.

Extension cable

A B - 0600 - S Y X

Category
A - Absolute encoder cable

Cable type
B - 6.3 mm diameter green encoder cable

Length

0100 - 1 m	1200 - 12 m
0300 - 3 m	1500 - 15 m
0600 - 6 m	2000 - 20 m

In-line connector
S - 8-way M12 (Renishaw)

Controller connector
Y - 6-way Molex (Yaskawa)

Other
X - Standard

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ADTa-100 adaptor cables

The ADTa-100 diagnostic tool has a standard 9-way female D-type input connector. For alternative pin-outs and connector options adaptor cables are required.

A A - 0100 - R A X

Category
A - Absolute encoder cable

Cable type
A - 4.7 mm diameter black encoder cable

Length [1]
0100 - 1 m
0300 - 3 m

In-line connector
A - 9-way D-type (Renishaw)
C - 17-way M23
D - 15-way D-type (Beckhoff)
F - Flying lead
G - 9-way D-type (iC-Haus)
H - 20-way Honda/Hirose (FANUC)
P - 10-way 3M/Molex (Mitsubishi)
R - FORTiS readhead connector
S - 8-way M12 (Renishaw)
T - 8-way M12 (alternative pin-out)
U - 8-way M12 (iC-Haus)
Y - 6-way Molex (Yaskawa)

ADT connector
A - 9-way D-type

Other
X - Standard

[1] When using a 9 metre Type A (4.7 mm diameter, black) or Type D (10 mm diameter, armoured) readhead cable, the 1 metre ADTa-100 adaptor cable should be selected.

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