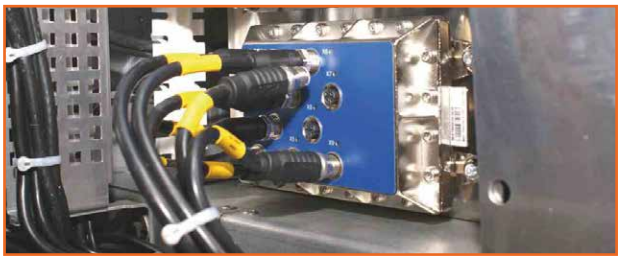
Ten47

M12 Connectors

Introduction

GTM12 Series



The industrially approved M12 connectors are becoming more and more widely used on systems for the railway industry.

The standard method for contact termination for M12 connectors has been soldering insulation displacement or screw terminals.

Tests and field experience have proven crimped contact terminations offer the best possible performance regarding endurance under vibration.

Low weight has become an ever important criteria even for components.

As humidity and moisture have to be considered for internal applications the ingress protection (IP rating) of electrical and electronic devices is a major factor of product evaluation.

Gimota AG has redesigned the common industrial M12 connector according to EN 61076–2–101 to the needs and demand of aliway applications. Meeting these criteria, vibration resistant, low weight, IP67 sealed.

The GTM12 connector series by Gimota AG offers a variety of M12 cable plugs/receptacles and bulkheads which are suitable for field assembly.

Technical Information

Electrical Properties

All electric data are valid on sea level with an environment temperature of 20°C. The mentioned temperature values are considered as limit temperatures

		A-coded 8 pole	A-coded 5 pole	D-coded
Service voltage	(V) DC	30	60	250
Operation current	(A)	2	4	4
Surge voltage	(kV)	0.8	1.5	2.5
Pollution degree[1]		3	3	3
Potential drop across contacts	(kV)	0.65	1.0	1.4
Potential drop between contacts and housing	(kV)	0.65	1.0	1.4
Data transfer speed	(Mbits/s)	(1000/Cat5e)	-	10/100

Requirements acc. IEC 60512, Test 4a at standard climate and mated plugs.
[1] Only if mated and tightened with counter-plug/receptacle.

Thermal Properties

	Strain relieve/Contact support [1]/Contact carrier [1]
Material	Thermoplastic, GRP
Service temperature	–25°C to 85°C
Fire resistance class UL94	V0
Fire characteristic NF F 16–101/102	I2/F2
Fire characteristic DIN EN 45545–2	NLP; R23: HL1/HL2/HL3
Fire characteristic DIN 510	S4/SR2/ST2

[1] Non-halogen, flame retarded

Technical Information

Mechanical Properties

		A-coded	D-coded
Number of contacts		5/8	4
Strand/wire adaptation		Crimp version	
Wire section	mm^2	5 × 0.34 (AWG 22) – 5 × 0.75 (AWG 18) 4 × 0.34 (AWG 22) – 4 × 0.50 (AWG 20) 8 × 0.20 (AWG 24) – 8 × 0.34 (AWG 22)	
Connecting life cycle of contacts (gold)[1] mating cycles		> 200	
Mating force[2]	(N)	maximum 10	
Separating force[2]	(N)	maximum 15	
Insulating resistance	(Ω)	≥ 10^8	
Contact material		0.5 µ Au over Cu-alloy	

[1] Requirements acc. IEC 60512, Test 9a
[2] Requirements acc. IEC 60512, Test 13b

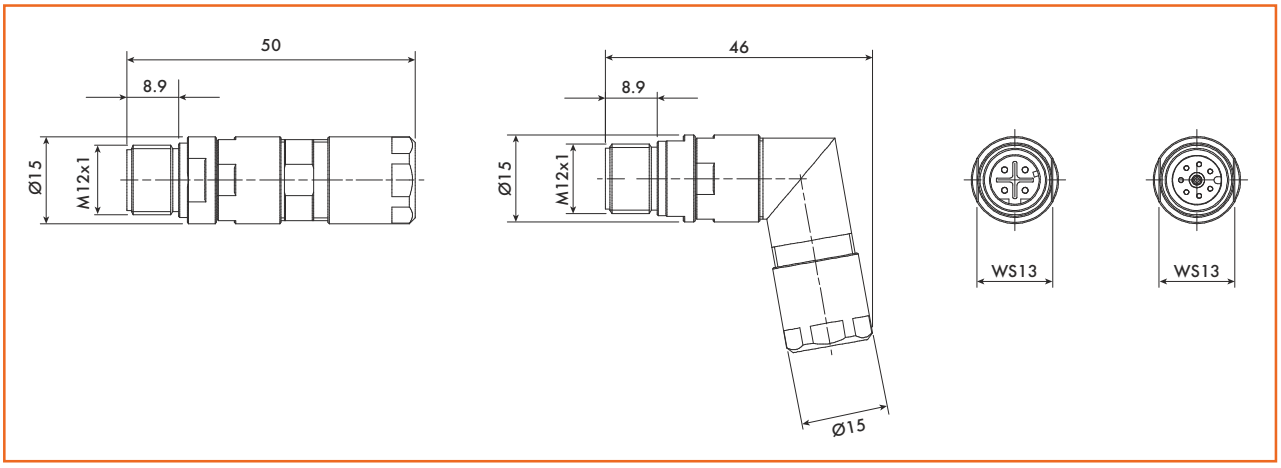
Mechanical Properties - Housing

	A–/D–coded
Housing	Brass, nickle plated
Cable strain relief	Cable gland
EMI screening at 360°	Shield spring
Cable diameter (mm)	5.0 - 9.0
Ingress protection (IEC EN 60529) closed	up to IP67

GTM12/GTB12 Series, for Field Assembling

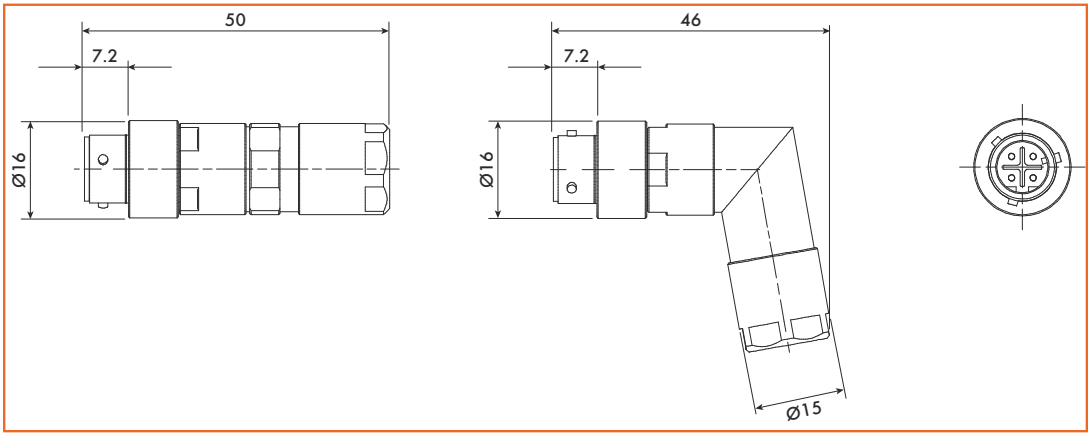
GTM12 Cable Plug

M12 A/D coded, Cable Plug



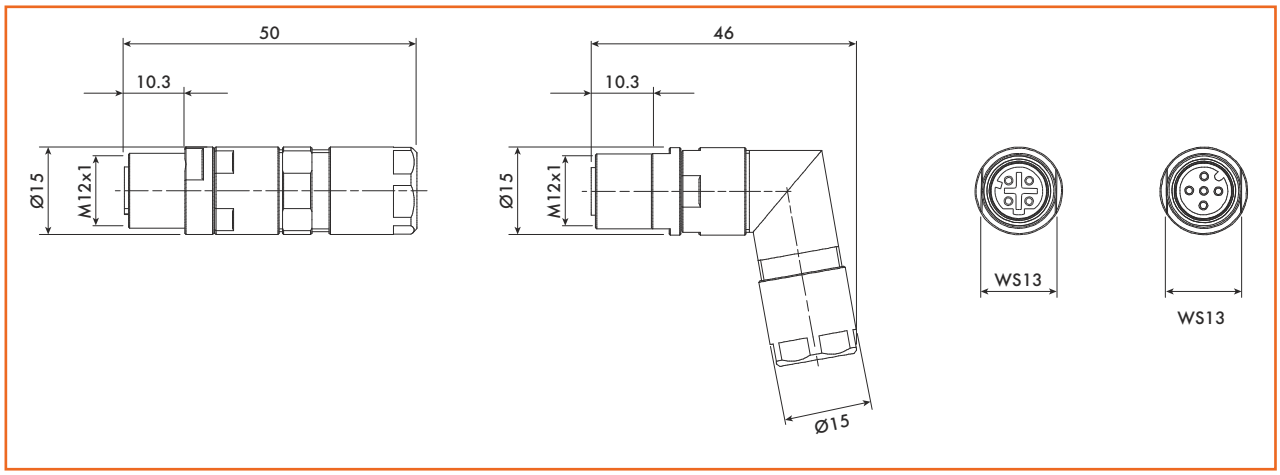
GTB12 Cable Plug

B12 D coded, Cable Plug



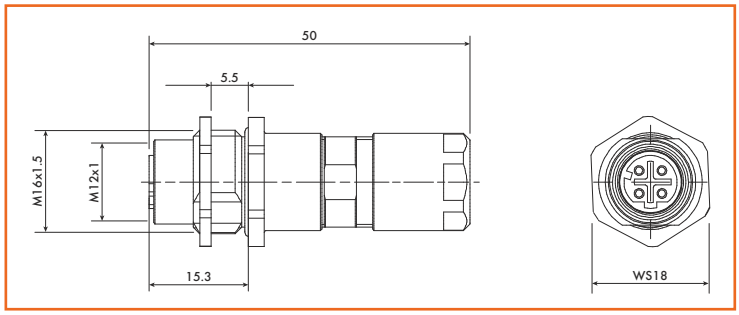
GTM12 Cable Receptacle

M12 A/D coded, Cable Receptacle

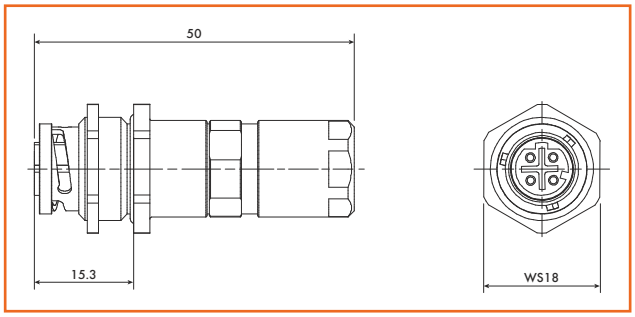


GTM12/GTB12 Bulkhead Receptacle

M12 D coded, Bulkhead Receptacle



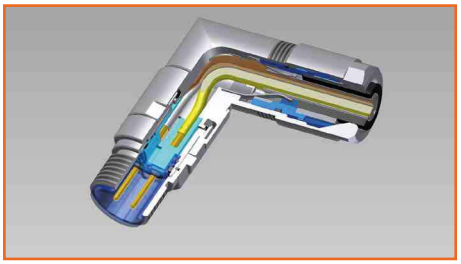
B12 D coded, Bulkhead Receptacle

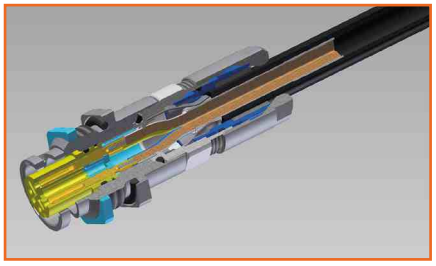


Item Number	Connector Type	Coding	No. Poles	Contact Type	Cable	Wire Section
GTM12–A–5–FS	Cable receptacle M12	A	5	Socket	5.0–9.0	0.34 (AWG 22) – 0.75 (AWG 18)
GTM12–A–5–FS–100	Cable receptacle M12, 100°	A	5	Socket	5.0–9.0	0.34 (AWG 22) – 0.75 (AWG 18)
GTM12–A–8–MP	Cable plug M12	A	8	Pin	5.0–9.0	0.20 (AWG 24) – 0.34 (AWG 22)
GTM12–A–8–MP–100	Cable plug M12, 100°	A	8	Pin	5.0–9.0	0.20 (AWG 24) – 0.34 (AWG 22)
GTM12–D–4–MP	Cable plug M12	D	4	Pin	5.0–9.0	0.34 (AWG 22)*
GTM12–D–4–MP–100	Cable plug M12, 100°	D	4	Pin	5.0–9.0	0.34 (AWG 22)*
GTM12–D–4–FS	Cable receptacle M12	D	4	Socket	5.0–9.0	0.34 (AWG 22)*
GTM12–D–4–FS–100	Cable receptacle M12, 100°	D	4	Socket	5.0–9.0	0.34 (AWG 22)*
GTM12–D–4–FS–BR	Bulkhead receptacle M12	D	4	Socket	5.0–9.0	0.34 (AWG 22)*
GTB12–D–4–MP	Cable plug B12, bayonet	D	4	Pin	5.0–9.0	0.34 (AWG 22)*
GTB12–D–4–MP–100	Cable plug B12, bayonet, 100°	D	4	Pin	5.0–9.0	0.34 (AWG 22)*
GTB12–D–4–FS–BR	Bulkhead receptacle B12, bayonet	D	4	Socket	5.0–9.0	0.34 (AWG 22)*
* Other wire sections on request						

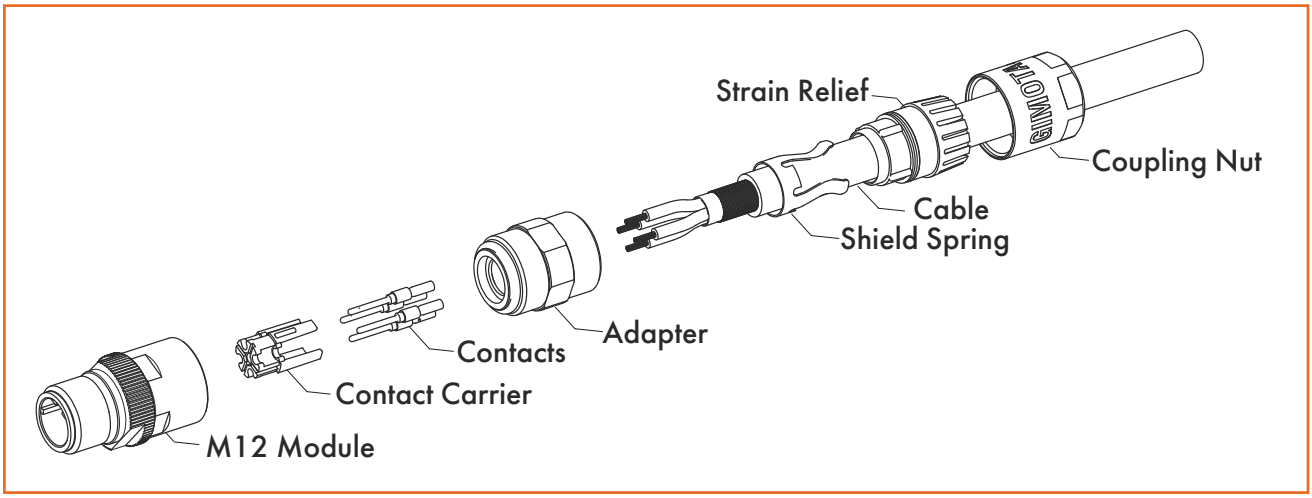
GTM12/GTB12 Connector

Construction GTM12/GTB12



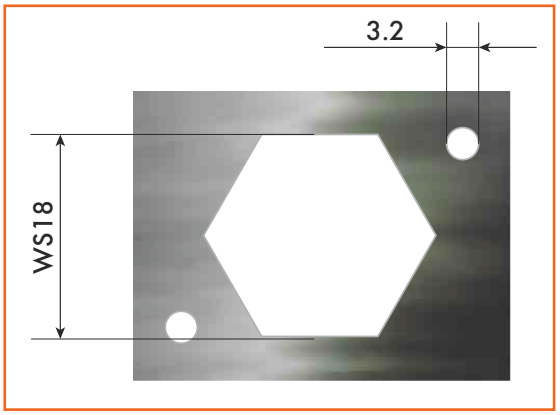


Assembly GTM12

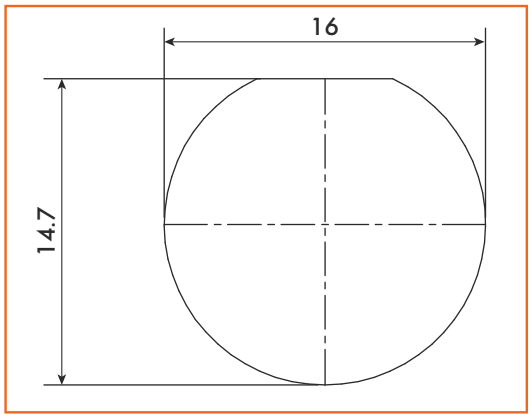


Panel Cut-out for Rear Panel Bulkhead Receptacle

For round bore holes a guard plate like GTM12–VSB1–1 for positioning and fixation is required.
This plate can selectively be screwed, riveted or glued to the panel.



GTM12–VSB1–1



Panel Cut-out

Accessories

Contacts – Crimpable, Machined Pin and Socket Contacts

GTM12 series connectors are supplied with adequate contacts. Additional lose contacts are available as following:

Material: Cu-alloy
Surface: 0.5 µm gold

Item Number	Contact Type	For Connector Coding	Wire Section (mm²)	PU (pcs)
GTM12PC24AU.20	Pin	A	0.20 (AWG24)	20
GTM12PC24AU.100	Pin	A	0.20 (AWG24)	100
GTM12PC22AU.20	Pin	A	0.34 (AWG22)	20
GTM12PC22AU.100	Pin	A	0.34 (AWG22)	100
GTM12PC20AU.20	Pin	D	0.50 (AWG20)	20
GTM12PC20AU.100	Pin	D	0.50 (AWG20)	100
GTM12SC22AU.20	Socket	D	0.34 (AWG22)	20
GTM12SC22AU.100	Socket	D	0.34 (AWG22)	100
GTM12SC20AU.20	Socket	D	0.50 (AWG20)	20
GTM12SC20AU.100	Socket	D	0.50 (AWG20)	100

Bayonet Socket Housing

Item Number	Connector Type	Contact Type	Adapter Thread	Wrench Size
GTM12B–BB–99*	Receptacle Shell	Socket	M12 x 1	20
* Suitable for Hirschmann switch/other models on request				

Protection Cap

Item Number	Connector Type
GTM12–MP–CAP	Protection cap for plugs
GTM12–FS–CAP	Protection cap for receptacles
GTB12–MP–CAP	Protection cap for plugs
GTB12–FS–CAP	Protection cap for receptacles

GTM12–MP–CAP

GTM12–FS–CAP

CICE/CIC Mounting Clip – for Standard C-rails (EMI/Insulated)

Mounting clips type CICE/CIC allow easy fixing of GTM12 cable connections with or without grounding of the shield potential. The clips can be mounted onto standard 35mm C-rails according EN 50022 (cap rail). To avoid potential drop of the shield to ground the clips are available with insulated clamps.

The mounting clips allow an easy and fast fixation of the GTM12 connectors. For increased mounting safety a standard cable tie can be applied at the brackets end.

Item Number	Clamping Range	EMI Contact	Suitable with
CICE35/12–16	12-16mm	Yes	GTM12
CIC35/12–16	12-16mm	No (Insulated)	GTM12
Mounting clip with cable tie: add ‘K’ behind the item number (Set) Example: CICE35/12–16K			

Application

The CICE/CIC Mounting Clip can be directly clicked onto the mounting C-rail. The data cable connected with the GTM12 connector system can be easily pushed into the mounting clip. For increased fixation safety the brackets can be additionally tightened together with a cable tie.

Tools

Wire Stripper for Strands and Wires (AWG20–30) GIW–ACK

Easy-to-use wire stripping tool for a quick and proper preparation of strands and wires. The single wires can be applied to a defined length and finally stripped accordingly.

- Stripping length of up to 25mm is possible.
- The wire size can easily be adjusted.
- Specially hardened blades ensure long-life and usage of the stripping device.

Item Number	Dimensions (mm)	Weight (g)	Use with	Wire Sections (mm^2)
GIW–ACK	98 × 45 × 21	30	Wire/Strands	0.05-0.5 (AWG30 - AWG20)

Crimping Tool GIW–AF8M for Machined Contacts

Universal four point crimping tool, suitable with machined contacts for Gimota GTM12/GTB12 connectors.

The use of the corresponding positioning adapter GIW–AF8M allows a correct and easy crimping application of pin and socket contacts (turn-over of the positioning adaptor).

The Gimota positioning adaptor ensures easy and appropriate positioning of the contact with the applied wire inside the tool.

Item Number Crimping Tool	Dimensions (mm)	Weight (g)	Use with	Item Number Positioning Adaptor
GIW–AF8M	175 × 60 × 22	300	GTM12 Contacts	GIW–AF8M–SK2/2

Wrench

High quality, chrome plated spanner, made from special tool steel, reduced material thickness of 2mm.
Key length of 142mm, 48g.
Wrench size 13mm and 14mm.

Item Number Tool	Dimensions (mm)	Weight (g)
GIW–DM12–MS14	142 x 38 x 2	48

Tightening Tool GIW–DM12 for GTM12 Connectors

Tightening tool to ensures the required maximum tightening torque for mating the GTM12 connectors. The included torque limiting devices ensure the correct tightening forces of 1Nm. The slim design of the tool head facilitates the use in connecting areas with limited access space.

Item Number	Dimensions (mm)	Weight (g)	Torque	Use with
GIW–DM12	L = 215	90	1Nm	M12 Connectors

Tool Box GIW–BOX–GTM12 for M12 Connector Assembling

A Convenient Toolbox for proper storage of the M12 Assembling tools.

The tools are not included with the item number.

Item Number	Dimensions (mm)	Weight (g)
GIW–BOX–GTM12	330 × 260 × 90	550

Installation Instructions GTM12/GTB12

Assembly Instruction GTM12/GTB12-4 pole

Push the coupling nut (1), cable gland (2) and the screen contact spring (3) onto the cable. **(Figure A)**

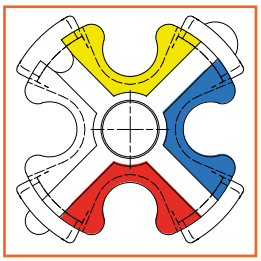
Strip off the cable insulation sheath by 24mm. Cut the metal shielding braid for 10–15mm. **(Figure B)**

Strip the wires to a length of 4.5–5.0mm. The use of the Gimota wire stripper GIW ACK is recommended. **(Figure C)**

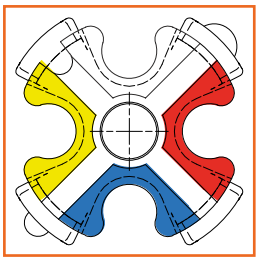
Push contacts onto stripped wire end and crimp with adequate crimping tool. Ensure visibility of the wire through the inspection hole at contact bucket side. The use of the crimping tool GIW–AF8M with the Gimota positioning adaptor GIW–AF8M–SK2/2 is recommended. **(Figure D)**

Push adapter (4) over the cable. **(Figure E)**

Arrange the contacts according to the colour coding as on the table shown below into the contact carrier (Ethernet-standard). **(Figure F) and the table below.**



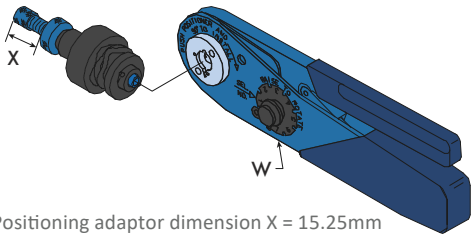
Pin Version



Socket Version

GTM12–D–4–MP/GTM12–D–4–FS/GTB12–D–4–MP

Contact	Occupancy	PNO - PROFInet	ODVA –ETHERNET/IP
Contact 1	TD+	Yellow	White-Orange
Contact 2	RD+	White	White-Green
Contact 3	TD-	Orange	Orange
Contact 4	RD-	Blue	Green



Positioning adaptor dimension X = 15.25mm
Selector W on GIW–AF8M = 6th position.

Figure A

Figure B

Figure C

Figure D

Figure A

Figure F

Insert the pre-assembled ethernet cable with the contact carrier - in compliance with the coding check mark (notch) – fully into the M12 - front-module (5) and screw it on the adapter.* **(Figure G)**

Slide the screen contact spring on the cable shield up to the stop in the adapter. It is important to make sure that the feet of the screen contact spring standing firmly on the braided shield. **(Figure H)**

Fully push the cable gland into the adapter, so that the feet of the screen contact spring come to lie under the cable gland and firmly press on the braided shield.

Close the M12 connector permanently, using two suitable 14mm spanner to screw the coupling nut to the adapter.*

* Applicable tighting torque is approx. 1.5 to 2.0Nm (maximum 3.0Nm)

Figure G

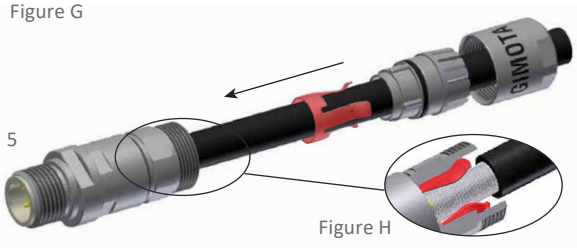


Figure H

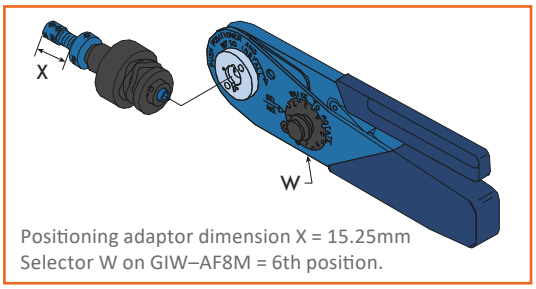
Assembly Instruction GTM12-8 pole

Push the coupling nut (1), cable gland (2) and the screen contact spring (3) onto the cable. **(Figure A)**

Strip off the cable insulation sheath by 24mm. Cut the metal shielding braid for 10–15mm. **(Figure B)**

Strip the wires to a length of 6.0–6.5mm. The use of the Gimota wire stripper GIW ACK is recommended. **(Figure C)**

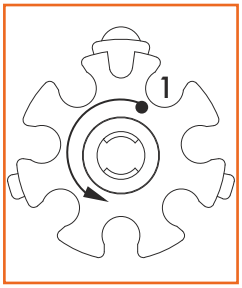
Push contacts onto stripped wire end and crimp with adequate crimping tool. Ensure visibility of the wire through the inspection hole at contact bucket side. The use of the crimping tool GIW–AF8M with the Gimota positioning adaptor GIW–AF8M–SK2/2 is recommended. **(Figure D)**



Positioning adaptor dimension X = 15.25mm
Selector W on GIW–AF8M = 6th position.

Push adapter (4) over the cable. **(Figure E)**

Arrange the contacts according to the colour coding as on the table shown below into the contact carrier (Ethernet-standard). **(Figure F) and the table below.**



Pin Version, front view

Figure A

Figure B

Figure C

Figure D

Figure A

Figure F

GTM12–A–8–MP

Contact	Wire colours acc. to TIA 568B	Contact	Wire colours acc. to TIA 568B
Contact 1	Blue/White	Contact 5	Green/White
Contact 2	Brown/White	Contact 6	Orange/White
Contact 3	Brown	Contact 7	Blue
Contact 4	Orange	Contact 8	Green

Insert the pre-assembled ethernet cable with the contact carrier - in compliance with the coding check mark (notch) - fully into the M12 - front-module (5) and screw it on the adapter.* **(Figure G)**

Slide the screen contact spring on the cable shield up to the stop in the adapter. It is important to make sure that the feet of the screen contact spring standing firmly on the braided shield. **(Figure H)**

Fully push the cable gland into the adapter, so that the feet of the screen contact spring come to lie under the cable gland and firmly press on the braided shield.

Close the M12 connector permanently, using two suitable 14mm spanner to screw the coupling nut to the adapter.*

* Applicable tighting torque is approx. 1.5 to 2.0Nm (maximum 3.0Nm)

Figure G

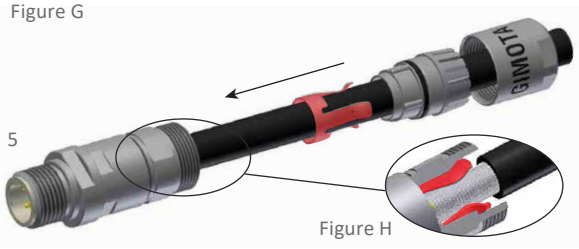


Figure H

Assembly Instruction GTM12/GTB12-4 pole, 100°

Push the coupling nut (1), cable gland (2) and the screen contact spring (3) onto the cable. **(Figure A)**

Figure A

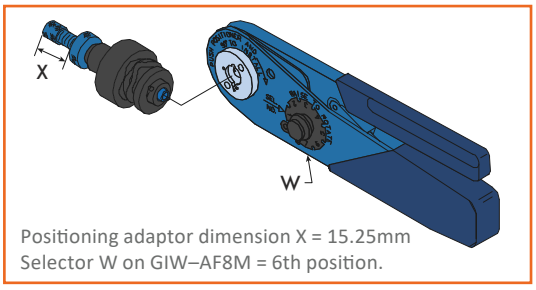
Strip off the cable insulation sheath by 40mm. Cut the metal shielding braid for 20mm. **(Figure B)**

Figure B

Push the 100° angle adapter over the cable. Strip the wires to a length of 4.5–5.0mm. The use of the Gimota wire stripper GIW–ACK is recommended. **(Figure C)**

Figure C

Push contacts onto stripped wire end and crimp with adequate crimping tool. Ensure visibility of the wire through the inspection hole at contact bucket side. The use of the crimping tool GIW–AF8M with the Gimota positioning adaptor GIW–AF8M–SK2/2 is recommended. **(Figure D)**

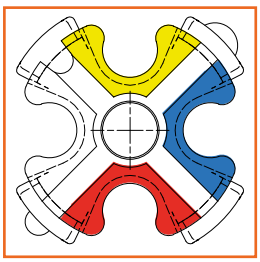


Positioning adaptor dimension X = 15.25mm
Selector W on GIW–AF8M = 6th position.

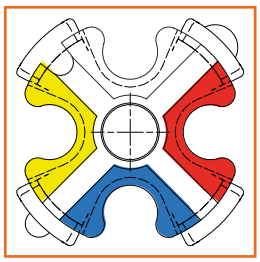
Figure D

Arrange the contacts according to the colour coding as on the table shown below into the contact carrier (Ethernet-standard). **(Figure E) and the table below.**

Figure E



Pin Version



Socket Version

GTM12–D–4–MP–100/GTM12–D–4–FS–100/GTB12–D–4–MP–100

Contact	Occupancy	PNO - PROFInet	ODVA - ETHERNET/IP
Contact 1	TD+	Yellow	White-Orange
Contact 2	RD+	White	White-Green
Contact 3	TD-	Orange	Orange
Contact 4	RD-	Blue	Green

Insert the pre-assembled Ethernet cable with the contact carrier - in compliance with the coding check mark (notch) completely into the M12 module (5).Screw the M12 module on the adapter with a spanner (maximum 2.5mm thickness) SW14.* The use of the Gimota spanner GIW–DM12–MS14 is recommended. **(Figure F)**

Slide the screen contact spring (3) on the cable shield up to the stop in the adapter. It is important to make sure that the feet of the screen contact spring standing firmly on the braided shield. **(Figure G)**

Fully push the cable gland (2) into the adapter, so that the feet of the screen contact spring come to lie under the cable gland and firmly press on the braided shield.

Close the M12 connector permanently, using two suitable 14mm spanner to screw (1) the coupling nut to the adapter.*

* Applicable tighting torque is approx. 1.5 to 2.0Nm (maximum 3.0Nm)

Figure F

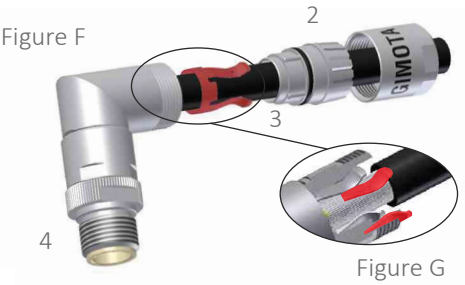


Figure G

Figure H

Assembly Instruction GTM12-8 pole, 100°

Push the coupling nut (1), cable gland (2) and the screen contact spring (3) onto the cable. **(Figure A)**

Figure A

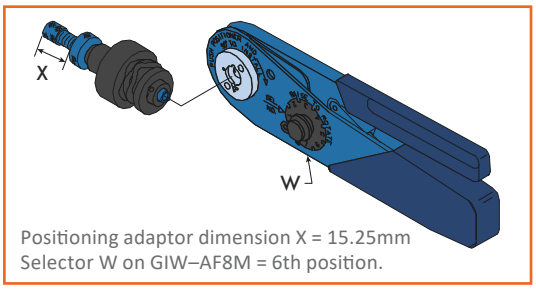
Strip off the cable insulation sheath by 40mm. Cut the metal shielding braid for 20mm. **(Figure B)**

Figure B

Push the 100° angle adapter over the cable. Strip the wires to a length of 6.0–6.5mm. The use of the Gimota wire stripper GIW–ACK is recommended. **(Figure C)**

Figure C

Push contacts onto stripped wire end and crimp with adequate crimping tool. Ensure visibility of the wire through the inspection hole at contact bucket side. The use of the crimping tool GIW–AF8M with the Gimota positioning adaptor GIW–AF8M–SK2/2 is recommended. **(Figure D)**



Positioning adaptor dimension X = 15.25mm
Selector W on GIW–AF8M = 6th position.

Figure D

Arrange the contacts according to the colour coding as on the table shown below into the contact carrier (Ethernet-standard). **(Figure E) and the table below.**

Figure E

GTM12–A–8–MP–100

Contact	Wire colours acc. to TIA 568B	Contact	Wire colours acc. to TIA 568B
Contact 1	Blue/White	Contact 5	Green/White
Contact 2	Brown/White	Contact 6	Orange/White
Contact 3	Brown	Contact 7	Blue
Contact 4	Orange	Contact 8	Green

Insert the pre-assembled Ethernet cable with the contact carrier - in compliance with the coding check mark (notch) completely into the M12 module (5). Screw the M12 module on the adapter with a spanner (maximum 2.5mm thickness) SW14.* The use of the Gimota spanner GIW–DM12–MS14 is recommended. **(Figure F)**

Slide the screen contact spring (3) on the cable shield up to the stop in the adapter. It is important to make sure that the feet of the screen contact spring standing firmly on the braided shield. **(Figure G)**

Fully push the cable gland (2) into the adapter, so that the feet of the screen contact spring come to lie under the cable gland and firmly press on the braided shield.

Close the M12 connector permanently, using two suitable 14mm spanner to screw (1) the coupling nut to the adapter.*

* Applicable tighting torque is approx. 1.5 to 2.0Nm (maximum 3.0Nm)

Figure F

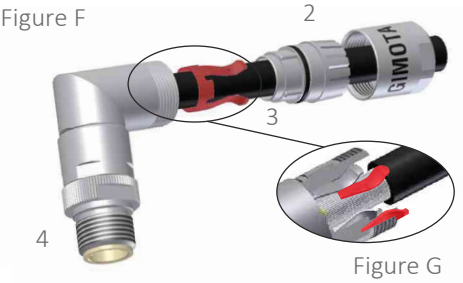


Figure G

Figure H

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