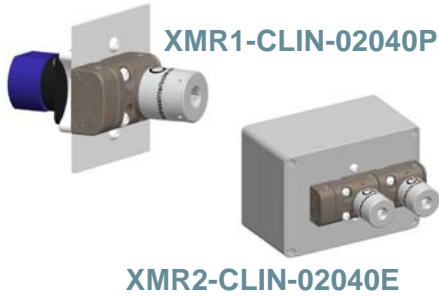


XMR/XMSR Key Exchange Box with Rotary Switch



XMR1-CLIN-02040P

XMR2-CLIN-02040E

The **XMR** and **XMSR** (full stainless steel version) are modular mechanical key exchange units complete with rotary switch(es) that are used to exchange one or more keys for a number of other keys. These devices form the link between isolation devices and access locks. Any combination of isolation / access keys are possible.

The XMR and XMSR can be fitted with 20A, 32A, 63A or 150A switches. The 20A and 32A switches can be fitted behind each module. The 63A and 150A switches must not have any switch fitted behind the immediately adjacent module(s). There are four mounting options - Panel, Enclosure, Back of Board Panel mounted using M-BOB adaptor(s) and Concealed.

IMPORTANT

This product is designed for use according to the installation and operating instructions enclosed. It must be installed by competent and qualified personnel who have read and understood the whole of this document prior to commencing installation. Any modification to, or deviation from these instructions invalidates all warranties. Fortress Interlocks Ltd. accepts no liability whatsoever for any situation arising from misuse or mis-application of this product.

IF YOU HAVE ANY QUESTIONS OR QUERIES OF ANY NATURE WHATSOEVER PLEASE CONTACT THE SUPPLIER WHO WILL BE PLEASED TO ADVISE AND ASSIST.

Tools and Fixings Required For Sealed Panel Mounting

2 off M6 screws of length 9 to 14mm for each of the modules with switch(es). 2 off M6 screws of length 29 to 34mm for every module.

The screws must project through the panel by 6 to 8mm.

2 off brass nuts and seals for each module without a switch (provided).

1 off Ø6.5 drill

1 off Ø9 drill

Phillips head screwdriver to suit the switch terminals (size depends on switch rating).
Driver to suit the chosen fixing screws above.

Sealed Panel Mounting

Mount the unit only in its correctly assembled condition to a flat steel panel of thickness between 3mm and 6mm.

1. Remove the two transportation screws to separate the XMR/XMSR from the rotary switch adaptor. Do not turn the switch or the key while the two halves of the product are apart.
2. Cut the 6mm square shaft on the end of the switch coupler to suit the panel thickness, see figure 3.
3. Drill the panel with the four Ø6.5 holes and one Ø9 hole for the module(s) with the switch(es) as shown in figures 7-10.
4. Drill two Ø6.5 holes for each of the modules without switches, if required.
5. Mount the switch(es) and adaptor(s) behind the panel and fix using 2 M6 screws at 60mm centres, for each switch.
6. Mount the XMR/XMSR onto the front of the panel and fit two screws to each module.
7. Fit two brass nuts and seals to each module without a switch.
8. Tighten all fixings to a torque of 8 to 10Nm (5.9 to 7.4 lbf ft).
9. All fixings must be permanently prevented from removal, either by vibration or by personnel using standard tools.
10. All fixings must be used.

Tools and Fixings Required For Back of Board Mounting

4 off M6 screws of length 55 to 60 for each of the module(s) with switch(es) (2 are provided)

2 off M6 screws of length 55 to 60 and M6 nuts for each module without a switch

1 off Ø6.5 drill

1 off Ø36 drill or hole saw

Phillips head screwdriver to suit the switch terminals (size depends on switch rating).
Driver to suit the chosen fixing screws above.

Back of Board Mounting

Mount the unit only in its correctly assembly condition to a flat steel panel of thickness between 3mm and 6mm.

1. Drill the panel with the four Ø6.5 holes and one Ø36 hole for the module(s) with the switch(es) as shown in figures 11-14
2. Drill two Ø6.5 holes and one Ø36 hole for each of the modules without switches, if required.
3. Remove the two M6x60 transportation screws to separate the back of board adaptor, XMR/XMSR and the rotary switch adaptor. Do not turn the switch(es) or the key(s) while the the product is apart.
4. Refit the two M6x60 transportation screws back through the panel, through the back of board adaptor, through the XM/XMS module and into the tapped holes in the rotary switch adaptor for each module with a switch.
5. Fit two more M6x60 screws into the module(s) with switch(es).
6. Fit two M6x60 screws into the module(s) without switch(es).
7. Tighten all fixings to a torque of 8 to 10Nm (5.9 to 7.4 lbf ft).
8. All fixings must be permanently prevented from removal, either by vibration or by personnel using standard tools.
9. All fixings must be used.

Installation Instructions

Tools and Fixings required for Enclosure Mounting

4 off M4/M6 screws depending on enclosure size

1 off Ø4.5/Ø6.5 drill and 4 off M4/M6 nuts or

1 off M4/M6 tap

1 off drill for cable entry holes

Phillips head screwdriver to suit the switch terminals (size depends on switch rating).

Phillips head screwdriver to suit the enclosure lid screws

Driver to suit the chosen fixing screws above

Sealed and Concealed Enclosure Mounting

Mount the unit only in its correctly assembly condition to a flat steel panel with a minimum thickness of 3mm.

1. Drill or tap the panel with four Ø4.5/Ø6.5 holes or M4/M6 holes in the positions shown in figure 5 or 6.
2. Remove the lid from the enclosure.
3. Drill the base of the enclosure with the cable entry holes.
4. Fix the base to the panel.
5. Pass the cables through the holes in the base.
6. Perform the electrical connections as described below.
7. Replace the lid of the enclosure.
8. All fixings must be permanently prevented from removal, either by vibration or by personnel using standard tools.
9. All fixings must be used

Electrical Connection

Check that the unit to be installed is of the same electrical type and voltage rating as the machine control circuits. Note that all units are designed to operate at +/- 10% of the normal supply voltage. The use of an incorrect voltage can seriously damage the unit.

The electrical system must incorporate fuse protection for all circuits, using a Quick-Acting (F) fuse to suit the switch current rating.

Please refer to figure 4 for the Terminal Numbers for the Rotary Switches. Bond the unit to Earth potential via a fixing screw.

The earth wire used must be multi-stranded Yellow and Green PVC sheathed and approved to BS 6231 with conductor cross-sectional area of 2.5mm².

The Earth lead must be fitted such that it will be the last to be broken if the wiring loom is pulled from the product.

When all wiring is complete, conduct a Protective Earth Test to BS 60204, clause 20. Test the unit for correct operation.

Functionality

Secondary keys are mechanically trapped until all the primary key(s) are inserted and turned. Only when all primary keys are inserted can the secondary key(s) be removed. Removing the first secondary key mechanically traps the primary key(s) in place.

Sequencing

The XMR / XMSR system is extremely flexible in terms of its sequencing possibilities. Two types of operation are possible. These are used individually or mixed to provide complex operation. The two types of operation are:

Sequential Operation

This is when the key in the module interacts only with its neighbouring modules. This dictates the order in which keys are inserted and removed.

Non- Sequential Operation

This is when two or more keys work together in a group. In a non-sequential system, any of the keys in the group can be operated together. Therefore the order in which keys are inserted or removed from the group is not dictated. However, all the keys in the group must be either all inserted and trapped or removed.

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XMR/XMSR Key Exchange Box with Rotary Switch

Installation Instructions

Maximum Permissible Wire Gauge

Wire Type	Units	20A	32A	63A	150A
Single Core or Stranded Wire	mm ²	2x2.5	2x6	2x16	70
	AWG	2x12	2x8	2x6	2/0
Flexible Wire	mm ²	2x2.5	2x4	2x10	50
	AWG	2x14	2x10	2x6	1/0

The 20A, 32A and 63A switches will accept 2 wires per terminal, one either side of the terminal screw, while the 150A switch will accept only one wire per terminal. Only copper wires are to be used.

Wire Strip Length

The wire strip length is the length of wire left exposed at the end of a cable when the insulation is removed. The recommended lengths are shown below.

Switch	Strip Length (mm)
20A	8
32A	11
63A	15
150A	20

Minimum Voltage and Current

The standard 20A switch has been tested to work down to 5mA at 20V. For lower voltage and current requirements, please contact Fortress.

DC Ratings

The rotary switches are all AC but have the following DC ratings:

DC Voltage	20A Switch	32A Switch	63A Switch	150A Switch
24V	20A	32A	63A	150A
48V	12A	25A	50A	150A
60V	4.5A	10A	16A	-
110V	1A	2A	3A	-
220V	0.4A	0.6A	0.7A	-
440V	0.27A	0.3A	-	-

Mechanical and Electrical Life

The mechanical life of the lock mechanism is 1,000,000 operations. The life of the rotary switch is shown below:

Switch Type	Mechanical Life (No of Operations)	AC-21A Electrical Life (No of Operations)
20A	1,500,000	100,000
32A	1,500,000	100,000
63A	1,500,000	100,000
150A	450,000	75,000

Approvals

The switches are approved to the following:

- 20A BS, CCC, CSA, GOST, IEC, UL
- 32A BS, CSA, GOST, IEC, UL
- 63A BS, CSA, GOST, IEC, UL
- 150A BS, CSA, GOST, IEC, UL

where

- BS = BS EN 60947 (British and EU)
- CCC = China Compulsory Certification
- CSA = Canadian Standards Association
- GOST = Gosudarstvennyj Standard (Russian)
- IEC = IEC 60947 – International Electrical Commission (Global)
- UL = Underwriters Laboratory (USA)

International Current Variations

BS/IEC/VDE Current Rating	UL Current Rating	CSA Current Rating
20A	20A	16A
32A	30A	30A
63A	65A	65A
150A	150A	150A

The XMR/XMSR sequence should have been specified at the purchasing stage. If the sequence needs to be changed, contact Fortress Interlocks.

Fitting of Additional Key Exchange Modules. The XMA/XMSA is supplied with its own Installation Instructions.

Back of Board (BOB) Mounting

The M-BOB is supplied with its own Installation and Maintenance Instructions. Only applicable to the XMR product.

Commissioning

Mechanical Function Test

- 1 Start with the secondary key(s) inserted.
- 2 Remove all primary keys.
- 3 Check that all the secondary keys are trapped in position.
- 4 Insert and turn the primary key(s).
- 5 Check that all of the secondary keys can be removed.
- 6 Ensure that when one secondary key is removed, all the primary keys remain trapped.

Electrical Function Test

- 1 Check that the switch(es) is (are) in the state(s) shown in the wiring diagram - see figure 5.
- 2 Insert the key and turn 120° clockwise or turn 120° anticlockwise and remove the key.
- 3 Check that the rotary switch(es) change(s) state.

Service and Inspection

Regular weekly inspection of the following is necessary to ensure trouble-free, lasting operation:

- 1 Secure mounting of components.
- 2 Debris and wear.
- 3 All locks should be lubricated with WD40.

There are no user serviceable parts in an XMR/XMSR module. If damage or wear is found, the whole module must be replaced.

If switch replacement is required, the switch(es) must only be obtained from Fortress Interlocks Ltd. This is because the switch arrangement has been specifically designed for these products and is non-standard. This is a safety critical issue.

Disposal

The XMR/XMSR does not contain any certified hazardous materials so should be disposed of as industrial waste.

Liability coverage is voided under the following conditions:

- 1 If these instructions are not followed.
- 2 Non-compliance with safety regulations.
- 3 Installation not performed by authorised personnel.
- 4 Non-implementation of functional checks.

Environmental Specification

- Environment Type: Indoor
- Ambient Temperature: Open to the air at 55°C during 24 hours with peaks up to 60°C Enclosed at 35°C during 24 hours with peaks up to 40°C
- Ingress Protection: IP67 (Sealed version)
IP50 (Unsealed version)

XMR/XMSR Key Exchange Box with Rotary Switch

Installation Instructions

Fig 1

PRODUCT	DIM A OVERALL LENGTH	DIM B NO OF SLOTTED HOLES	DIM C NO OF CL LOCKS
XM2	136.3	4	2
XM3	193.45	6	3
XM4	250.6	8	4
XM5	307.75	10	5
XM6	364.9	12	6
XM7	422.05	14	7
XM8	479.2	16	8
XM9	536.35	18	9
XM10	593.5	20	10

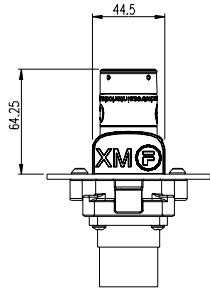
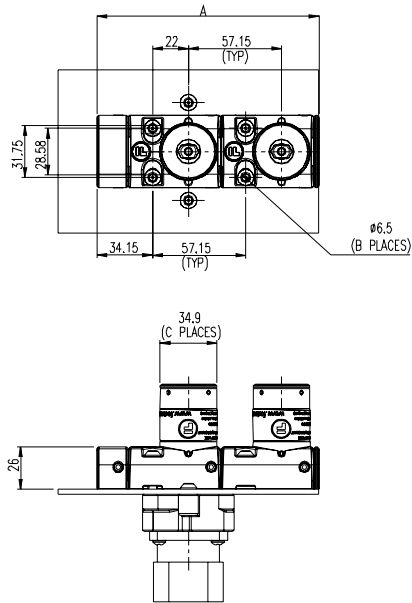
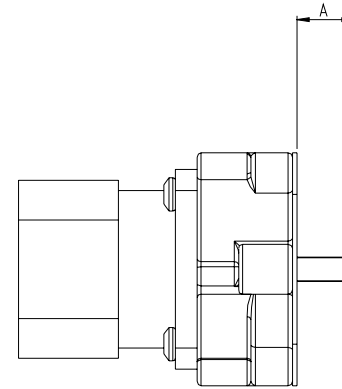


Fig 3

Modification to Suit Panel Thickness



PANEL THICKNESS	DIMENSION A
3	12
4	13
5	14
6	15

Fig 2

PRODUCT	DIM A OVERALL LENGTH	DIM B NO OF SLOTTED HOLES	DIM C NO OF CL LOCKS
XM2	136.3	4	2
XM3	193.45	6	3
XM4	250.6	8	4
XM5	307.75	10	5

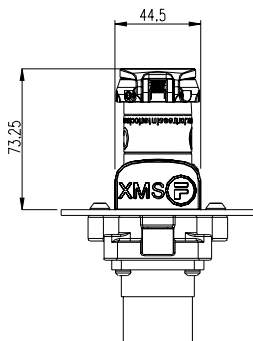
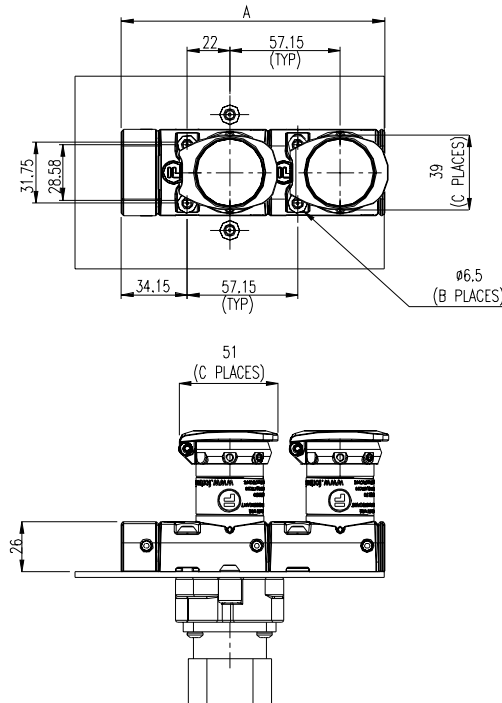
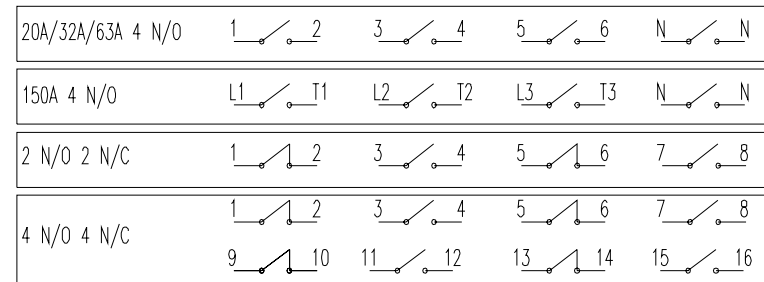


Fig 4

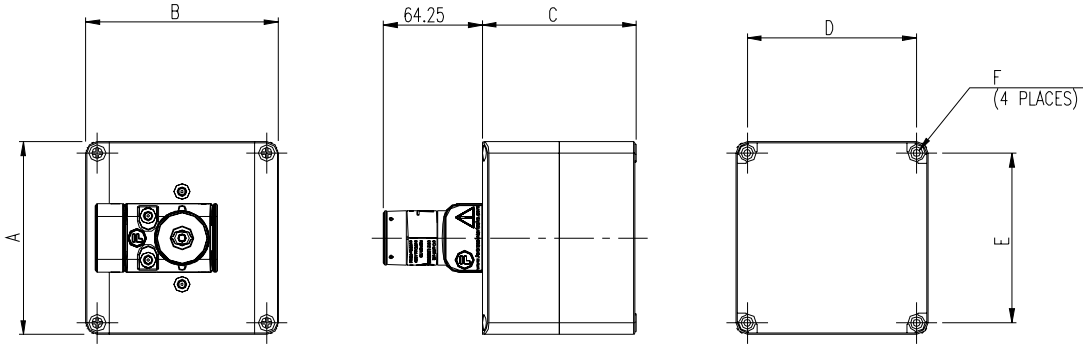
Wiring Diagram



XMR/XMSR Key Exchange Box with Rotary Switch

Sealed Enclosure

Fig 5



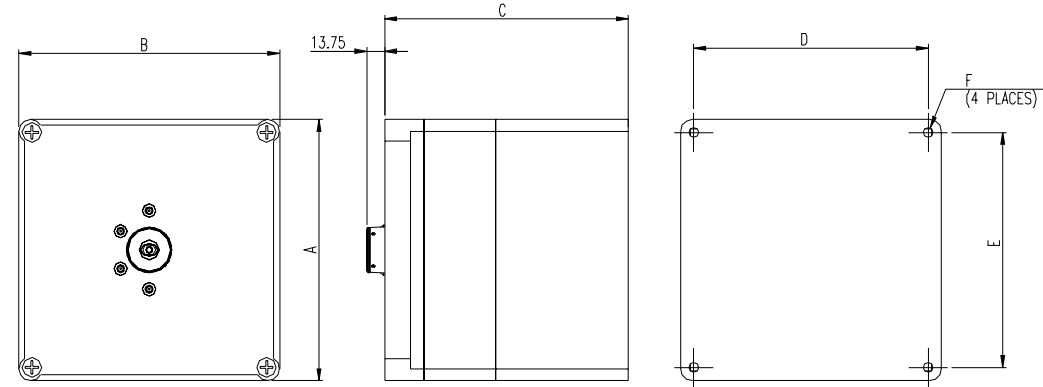
No OF LOCKS	SWITCH CURRENT	A	B	C	D	E	F
1	20 / 32 AMP	125MM	125MM	100MM	110MM	110MM	ø4.7
1	63 AMP	200MM	200MM	130MM	180MM	180MM	ø4.7
1	150 AMP	200MM	200MM	185MM	180MM	180MM	ø4.7
2	20 / 32 AMP	125MM	175MM	100MM	110MM	160MM	ø4.7
2	63 AMP	200MM	200MM	130MM	180MM	180MM	ø7.5
2	150 AMP	200MM	200MM	185MM	180MM	180MM	ø7.5
3	20 / 32 AMP	200MM	300MM	130MM	280MM	180MM	ø7.5
3	63 AMP	200MM	300MM	130MM	280MM	180MM	ø7.5
3	150 AMP	200MM	300MM	185MM	280MM	180MM	ø7.5
4	20 / 32 AMP	200MM	300MM	130MM	280MM	180MM	ø7.5
4	63 AMP	200MM	400MM	130MM	380MM	180MM	ø7.5
4	150 AMP	200MM	400MM	185MM	380MM	180MM	ø7.5
5	20 / 32 AMP	200MM	400MM	130MM	380MM	180MM	ø7.5
5	63 AMP	200MM	400MM	130MM	380MM	180MM	ø7.5
5	150 AMP	200MM	400MM	185MM	380MM	180MM	ø7.5
6	20 / 32 AMP	200MM	400MM	130MM	380MM	180MM	ø7.5
6	63 AMP	300MM	600MM	130MM	580MM	280MM	ø7.5
6	150 AMP	300MM	600MM	185MM	580MM	280MM	ø7.5
7	20 / 32 AMP	300MM	600MM	130MM	580MM	280MM	ø7.5
7	63 AMP	300MM	600MM	130MM	580MM	280MM	ø7.5
7	150 AMP	300MM	600MM	185MM	580MM	280MM	ø7.5
8	20 / 32 AMP	300MM	600MM	130MM	580MM	280MM	ø7.5
8	63 AMP	300MM	600MM	130MM	580MM	280MM	ø7.5
8	150 AMP	300MM	600MM	185MM	580MM	280MM	ø7.5
9	20 / 32 AMP	300MM	600MM	130MM	580MM	280MM	ø7.5
9	63 AMP	300MM	600MM	130MM	580MM	280MM	ø7.5
9	150 AMP	300MM	600MM	185MM	580MM	280MM	ø7.5

Installation Instructions



Concealed Enclosure

Fig 6

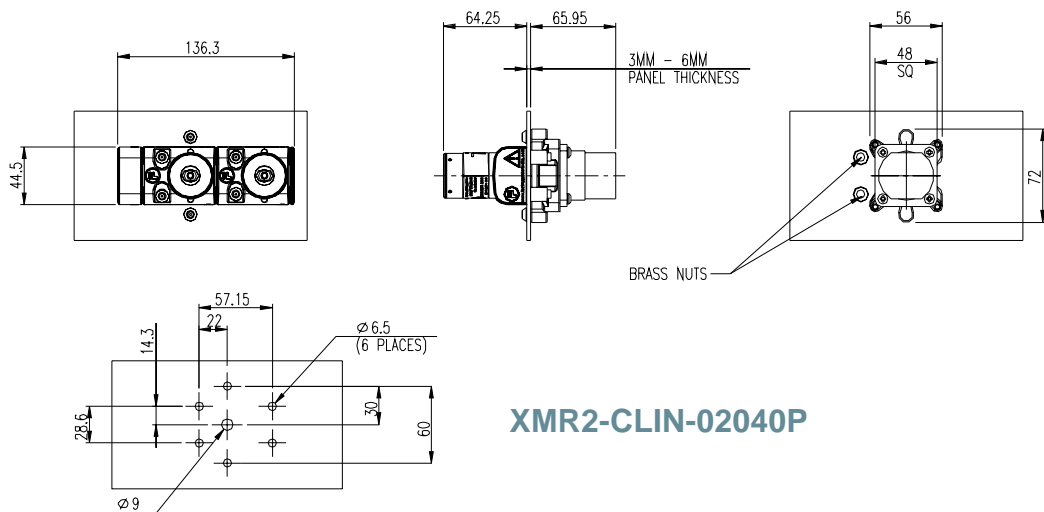


No OF LOCKS	SWITCH CURRENT	A	B	C	D	E	F
1	20A	200	200	130	110	110	ø4.7
1	32A/63A	200	200	185	180	180	ø7.5
1	150A	300	300	240	180	180	ø7.5
2	20A	200	200	130	180	180	ø7.5
2	32A/63A	200	200	185	180	180	ø7.5
2	150A	300	300	240	180	180	ø7.5
3	20A	200	300	130	280	180	ø7.5
3	32A/63A	200	300	185	280	180	ø7.5
3	150A	300	300	240	280	180	ø7.5
4	20A	200	400	130	380	180	ø7.5
4	32A/63A	200	400	185	380	180	ø7.5
4	150A	300	400	240	380	180	ø7.5
5	20A	200	400	130	380	180	ø7.5
5	32A/63A	200	400	185	380	180	ø7.5
5	150A	300	400	240	380	180	ø7.5
6	20A	300	600	130	580	280	ø7.5
6	32A/63A	300	600	185	580	280	ø7.5
6	150A	300	600	240	580	280	ø7.5
7	20A	300	600	130	580	280	ø7.5
7	32A/63A	300	600	185	580	280	ø7.5
7	150A	300	600	240	580	280	ø7.5
8	20A	300	600	130	580	280	ø7.5
8	32A/63A	300	600	185	580	280	ø7.5
8	150A	300	600	240	580	280	ø7.5
9	20A	300	600	130	580	280	ø7.5
9	32A/63A	300	600	185	580	280	ø7.5
9	150A	300	600	240	580	280	ø7.5

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XMR/XMSR Key Exchange Box with Rotary Switch

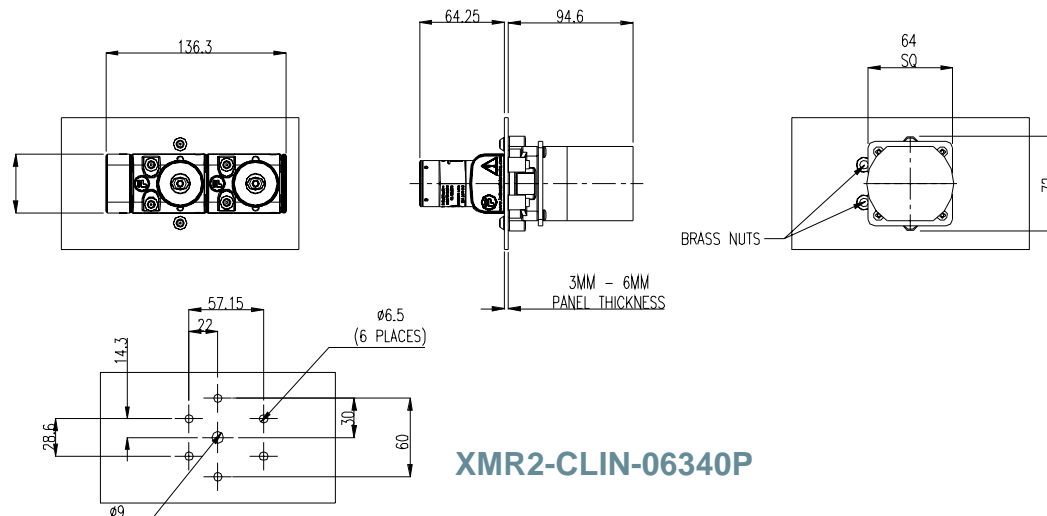
Sealed Panel Mounting



XMR2-CLIN-02040P

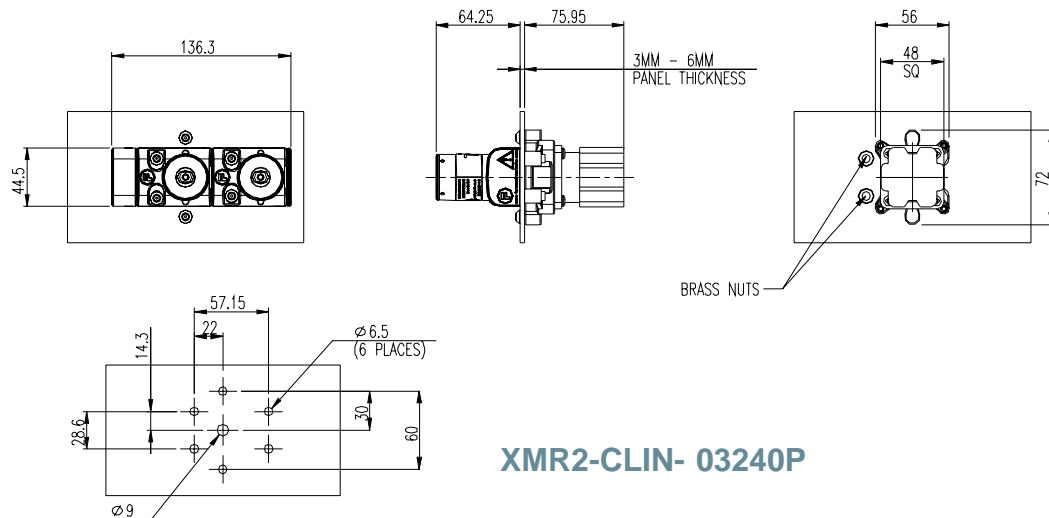
Fig7

Installation Instructions



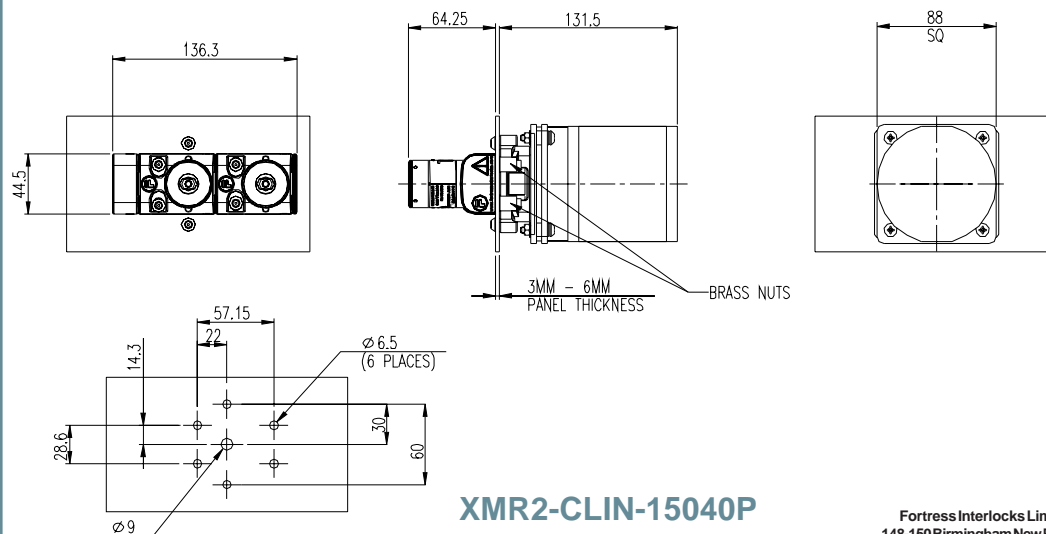
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Fig 8



XMR2-CLIN-03240P

Fig 9

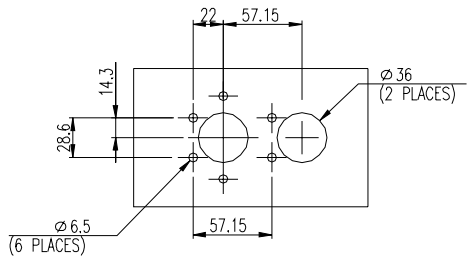
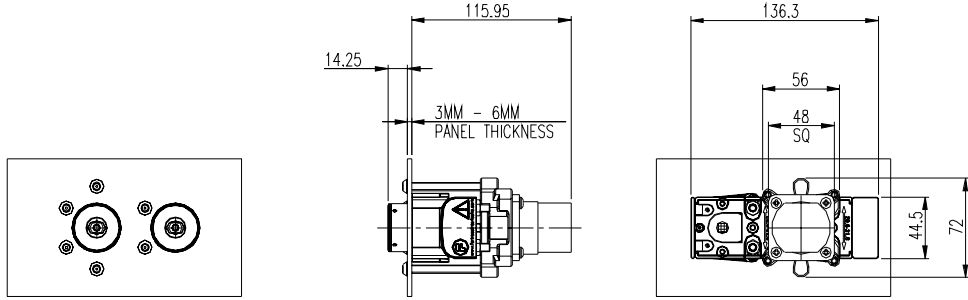


XMR2-CLIN-15040P

Fig 10

XMR/XMSR Key Exchange Box with Rotary Switch

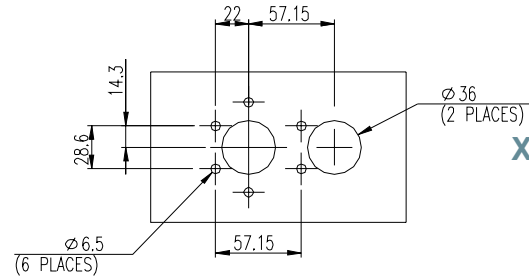
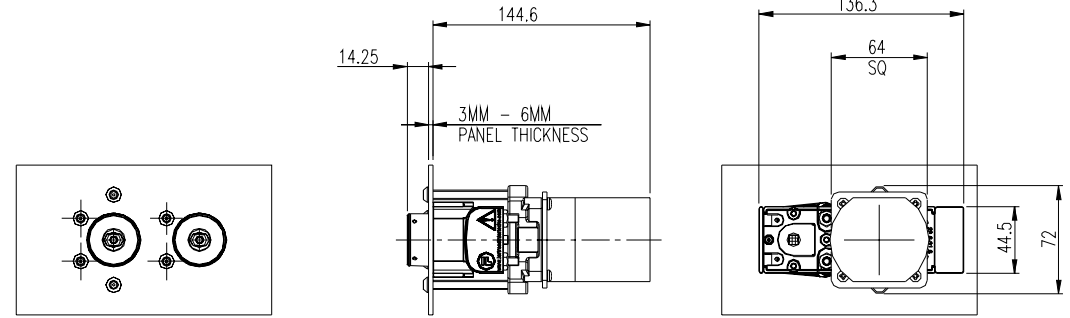
Back of Board Mounting



XMR2-CLIN-02040P

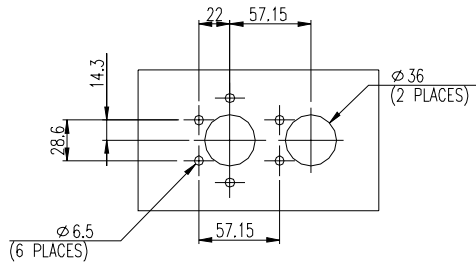
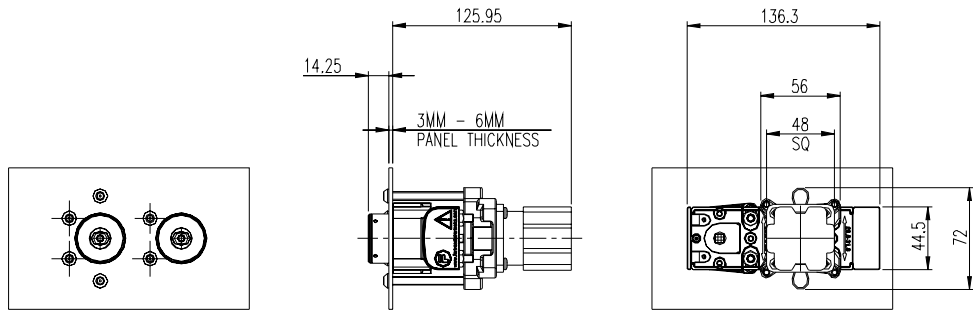
Fig 11

Installation Instructions



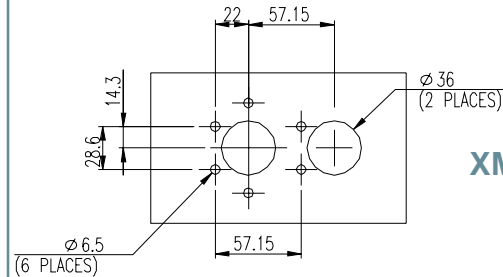
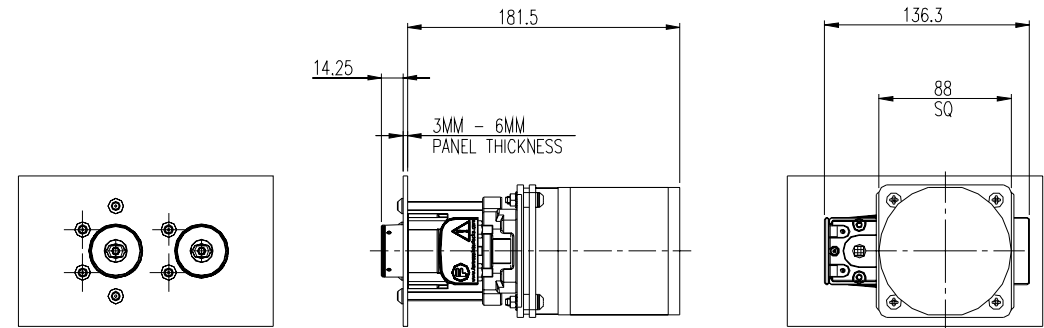
XMR2-CLIN-06340P

Fig 12



XMR2-CLIN-03240P

Fig 13



XMR2-CLIN-15040P

Fig 14

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