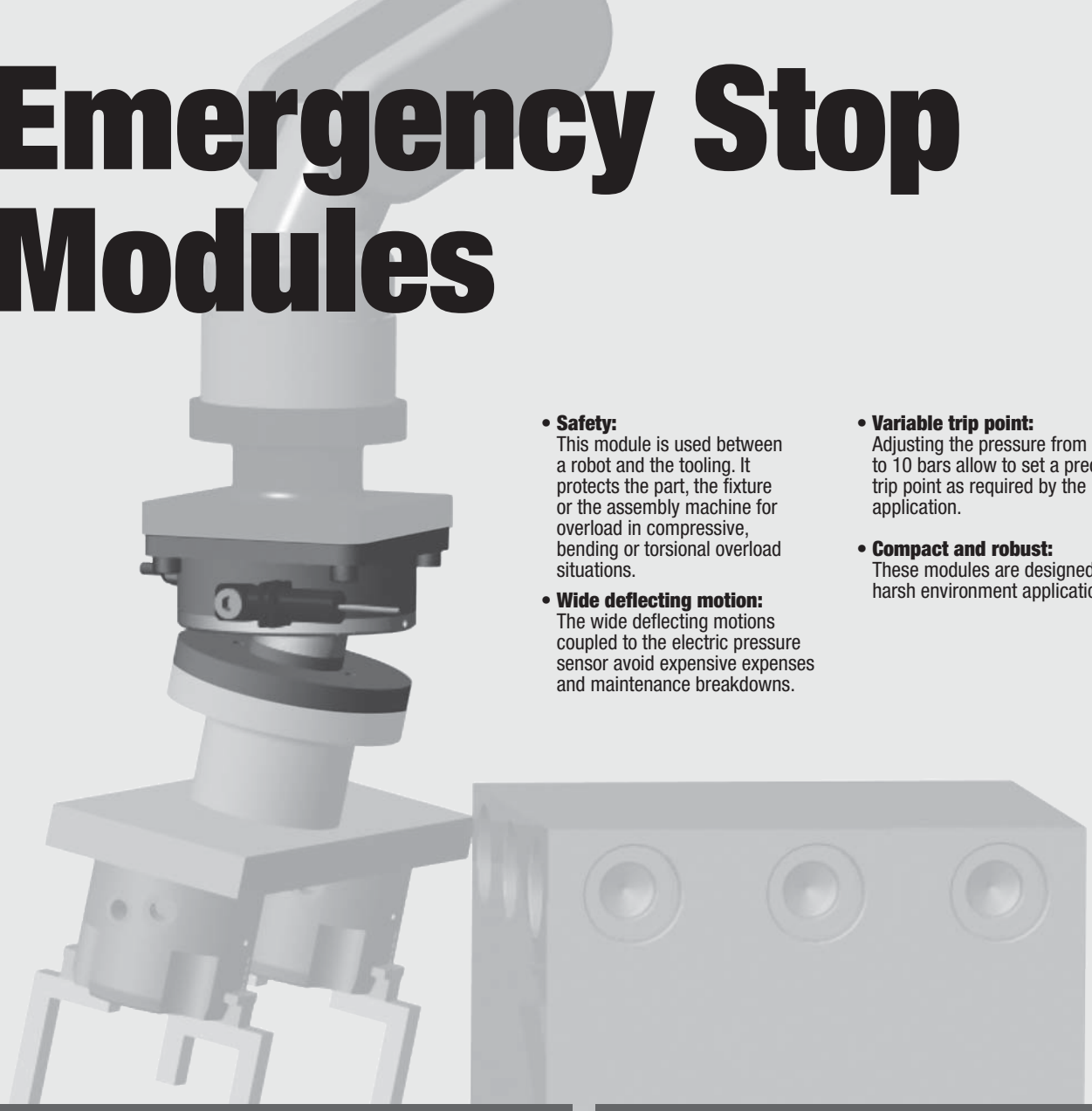
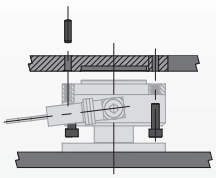
Emergency Stop Modules



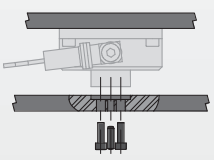
- **Safety:** This module is used between a robot and the tooling. It protects the part, the fixture or the assembly machine for overload in compressive, bending or torsional overload situations.
- **Wide deflecting motion:** The wide deflecting motions coupled to the electric pressure sensor avoid expensive expenses and maintenance breakdowns.
- **Variable trip point:** Adjusting the pressure from 2 to 10 bars allow to set a precise trip point as required by the application.
- **Compact and robust:** These modules are designed for harsh environment applications.

Mounting Information:

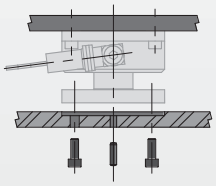
Modules can be mounted & operated in any orientation



The module is located using pilot boss and a dowel pin and assembled with 4 thru body screws



The tooling is located using pilot boss and a dowel pin and assembles with 3 or 4 screws



Using the blank plate allows the customer to locate and assemble its tooling to their convenience

Technical Specifications:

Pneumatic Specifications	**Imperial**	**Metric**
Pressure Operating Range	30-145 psi	2-10 bar
Cylinder Type	Non-Conventional	
Dynamic seals	Internally lubricated Buna-N seals	
Valve Required to Operate	0-145 PSI regulator	

Air Quality Requirements	
Air Filtration	40 Micron or Better
Air Lubrication	Not Necessary*
Air Humidity	Low Moisture Content (dry)

Temperature Operating Range	-30°~180° F	-35°~80° C

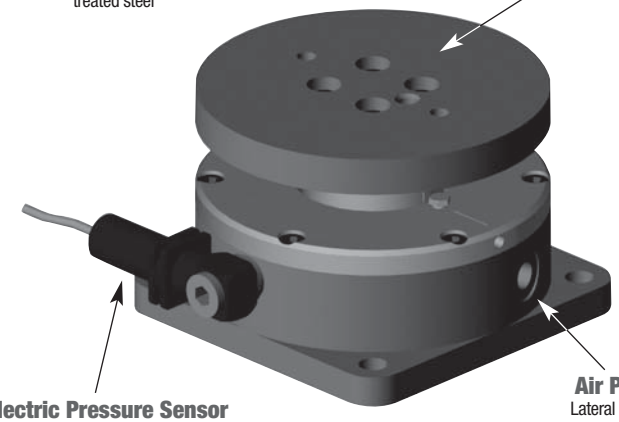
Maintenance Specifications**	
Expected Life	
Normal Application	5 million cycles
w/ Preventative Maintenance	10+ million cycles
Field Repairable	Yes
Seal Repair Kits Available	Yes

*Addition of lubrication will greatly increase service life
**See Maintenance Section

Product Features

Quality Components
Made from aluminum alloy with red coat anodization. The modules main components are made of heat treated steel

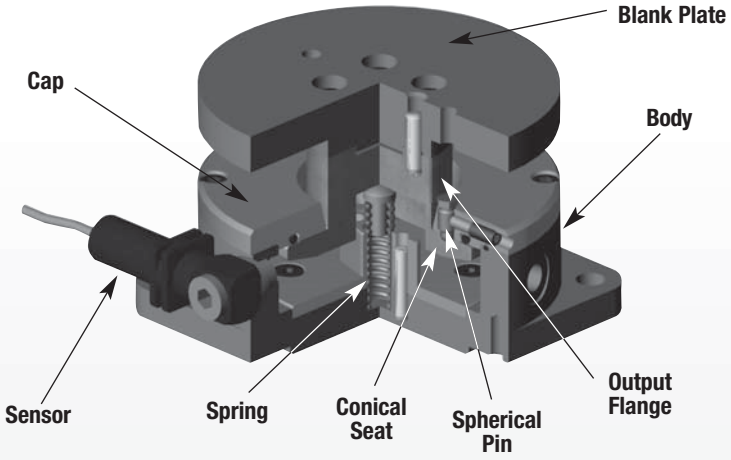
Tooling Attachment
Tooling can be mounted directly on the output flange or using the provided blank flange

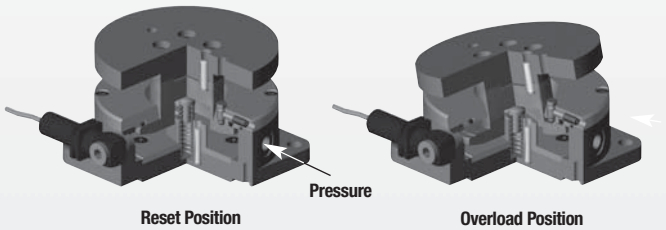


Electric Pressure Sensor
Transmits a signal to the PLC in case of and overload or collision

Air Ports
Lateral air port

Operating Principle





- The conical seat in the output flange and the spherical pin are used to place the module in the home position.
- The pressure inside the chamber applies an effort on the output flange to keep it in the home position.
- When an outside force or moment applied to the output flange is higher then the preset force, the conical seat moves from the spherical pin generating an air leakage.
- The air leakage causes a pressure fall down in the module chamber which is detected by the sensor. The tool reset has to be done manually.

Style - Emergency Stop Modules

Size-60

Style:	**AU-60**	
Axial Compliance:	0.28 in.	7 mm
Rotation:	45º	45º
Angular:	12º	12º
Weight:	0.99 lbs.	0.45 Kg

See Page 6.102

Style - Emergency Stop Modules

Size-80

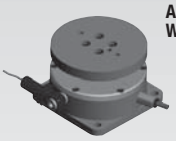
Style:	**AU-80**	
Axial Compliance:	0.334 in.	8.5 mm
Rotation:	24º	24º
Angular:	12º	12º
Weight:	1.5 lbs.	0.68 Kg

See Page 6.103

Style - Emergency Stop Modules

Size-110

Style:	**AU-110**	
Axial Compliance:	0.531 in.	13.5 mm
Rotation:	31º	31º
Angular:	12º	12º
Weight:	4.6 lbs.	2.1 Kg

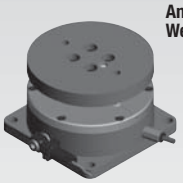


See Page 6.104

Style - Emergency Stop Modules

Size-140

Style:	**AU-140**	
Axial Compliance:	0.63 in.	16 mm
Rotation:	45º	45º
Angular:	12º	12º
Weight:	8.8 lbs.	4.0 Kg

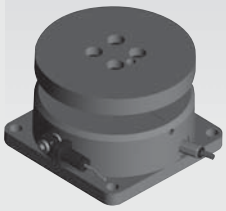


See Page 6.105

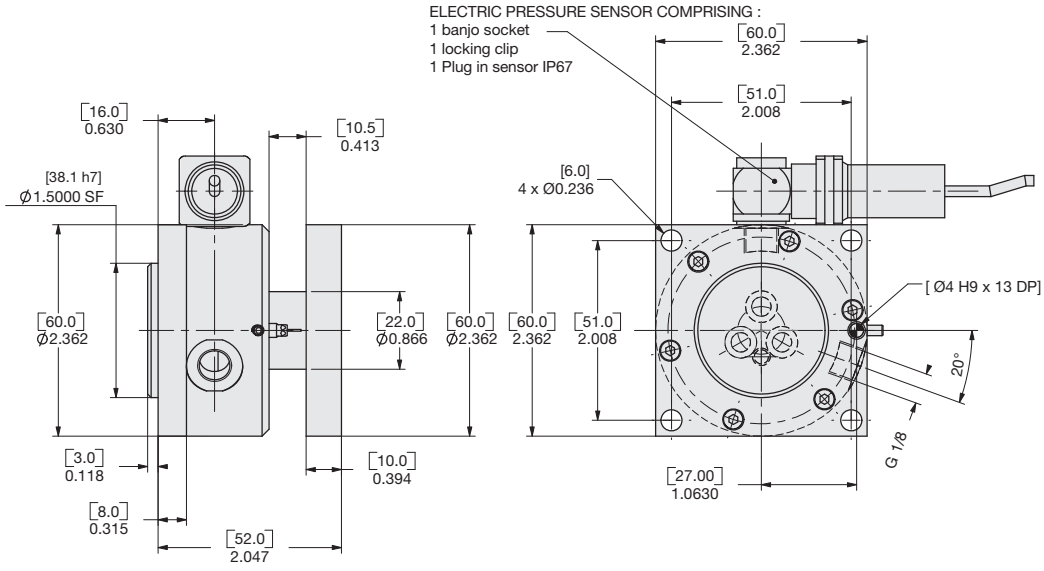
Style - Emergency Stop Modules

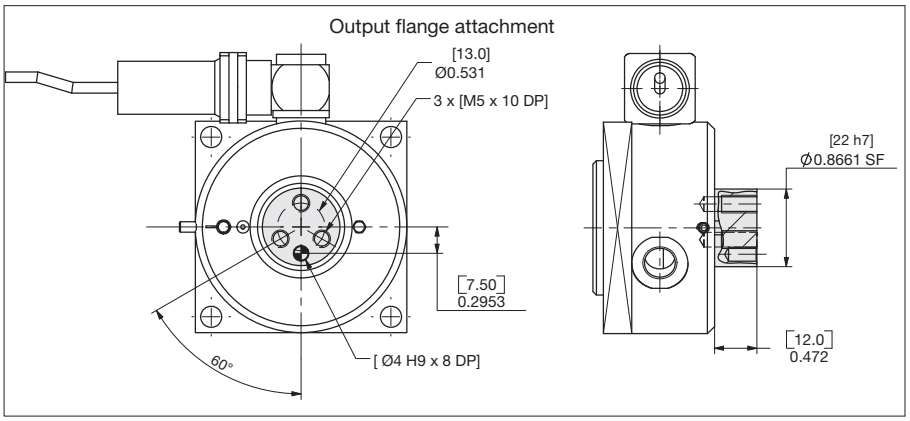
Size-165

Style:	**AU-165**	
Axial Compliance:	0.67 in.	17 mm
Rotation:	24º	24º
Angular:	12º	12º
Weight:	12.8 lbs.	5.8 Kg



See Page 6.106





Specifications	AU-60	
Maximum Payload	4.0 lbs.	1.8 Kg
Rotational Compliance (X and Y axis)	12°	12°
Rotational Compliance (Z axis)	45°	45°
Axial Compliance (Z axis)	0.28 in.	7 mm
Weight	0.99 lbs.	0.45 Kg
Pressure Range (locked cylinder)	30-145 psi	2-10 bar
Cylinder bore	1.77 in.	45 mm
Displacement	0.06 in.^{3}	1 cm^3
Temperature Range	-30°~180° F	-35°~80° C
Repeatability	±0.002 in.	±0.05 mm
Valve required to actuate	3-way, 2-position	

UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Dimensions are symmetrical about centerline

Third Angle Projection

All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]

Metric Threads Course Pitch

Imperial in.	Metric [mm]
0.00 = ±.01	[0.] = [±.25]
0.000 = ±.005	[0.0] = [±.13]
0.0000 = ±.0005	[0.00] = [±.013]

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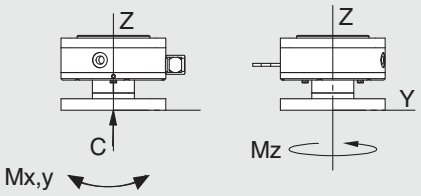


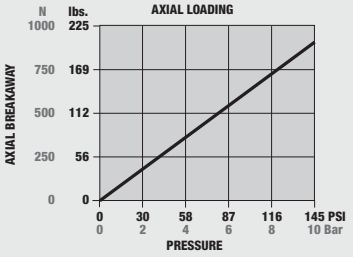
Loading Capacity at 100 psi 7 bar	Imperial	Metric
Maximum Breakaway Compressive **C**	139 lbs.	620 N
Maximum Breakaway Moment **Mx**	124 in.-lbs.	14 Nm
Maximum Breakaway Moment **My**	89 in.-lbs.	10 Nm
Maximum Breakaway Moment **Mz**	124 in.-lbs.	14 Nm

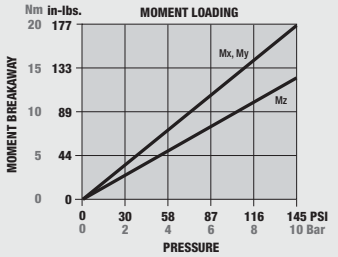
How to Order: (Order Accessories separately from Basic Model)

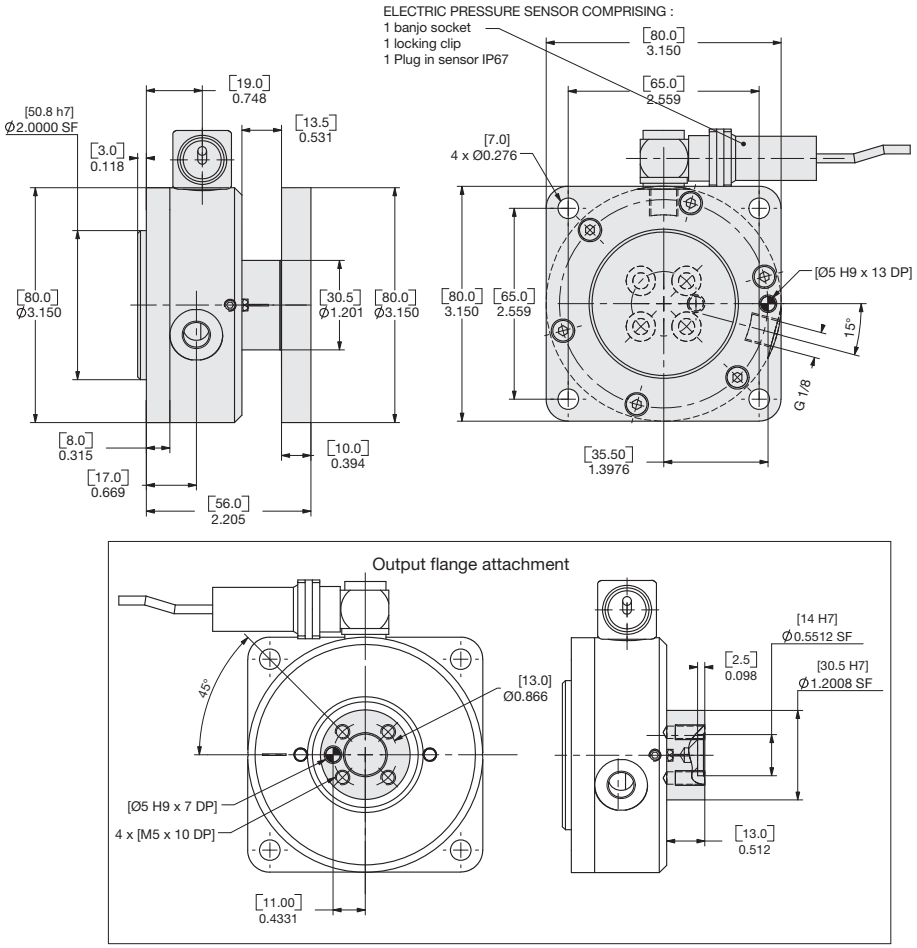
BASIC MODEL

AU-60

Maximum Overload







Specifications	AU-80	
Maximum Payload	10.0 lbs.	4.5 Kg
Rotational Compliance (X and Y axis)	12°	12°
Rotational Compliance (Z axis)	24°	24°
Axial Compliance (Z axis)	0.334 in.	8.5 mm
Weight	1.5 lbs.	0.68 Kg
Pressure Range (locked cylinder)	30-145 psi	2-10 bar
Cylinder bore	2.4 in.	61 mm
Displacement	0.99 $in.^3$	16.3 cm^3
Temperature Range	-30°~180° F	-35°~80° C
Repeatability	±0.0025 in.	±0.06 mm
Valve required to actuate	3-way, 2-position	

UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Dimensions are symmetrical about centerline

Third Angle Projection

All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]

Metric Threads Course Pitch

Imperial in.	Metric [mm]
0.00 = ± .01	[0.] = [± .25]
0.000 = ± .005	[0.0] = [± .13]
0.0000 = ± .0005	[0.00] = [± .013]

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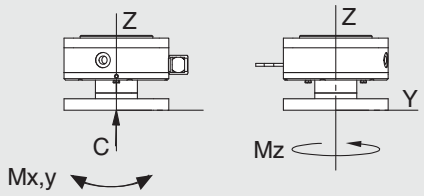


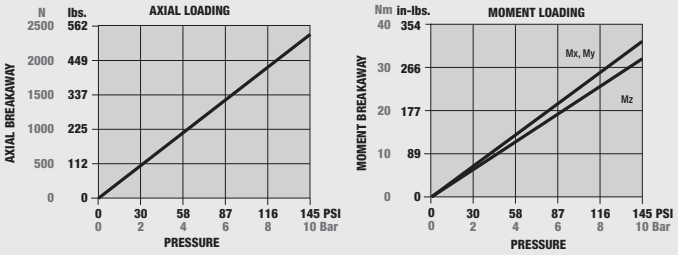
Loading Capacity at 100 psi 7 bar	Imperial	Metric
Maximum Breakaway Compressive **C**	372 lbs.	1655 N
Maximum Breakaway Moment **Mx**	195 in.-lbs.	22 Nm
Maximum Breakaway Moment **My**	221 in.-lbs.	25 Nm
Maximum Breakaway Moment **Mz**	195 in.-lbs.	22 Nm

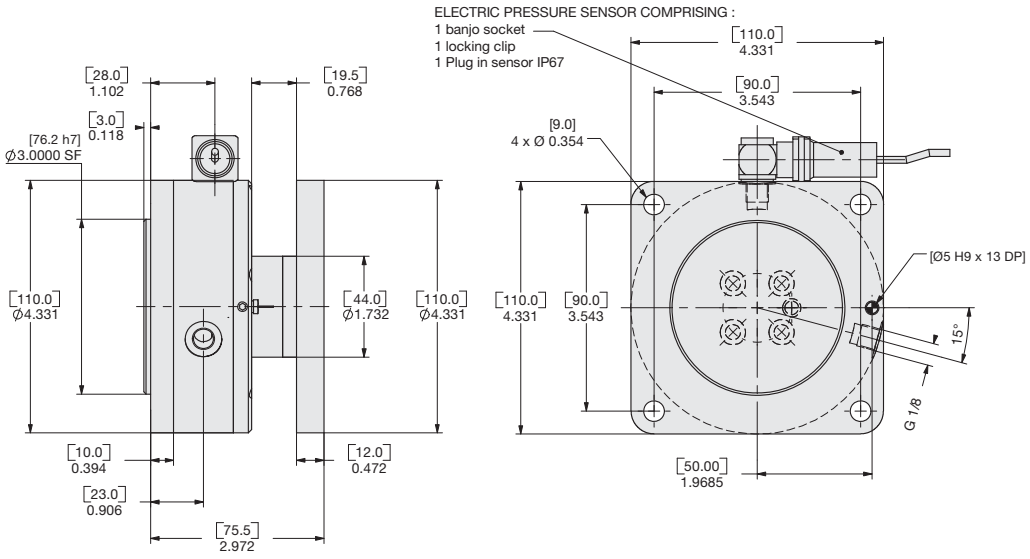
How to Order: (Order Accessories separately from Basic Model)

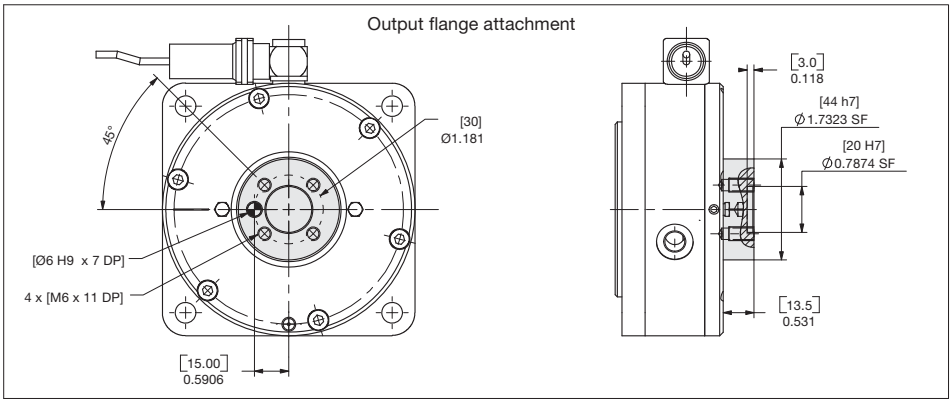
BASIC MODEL

AU-80

Maximum Overload







Specifications	**AU-110**	
Maximum Payload	18.8 lbs.	8.5 Kg
Rotational Compliance (X and Y axis)	12°	12°
Rotational Compliance (Z axis)	31°	31°
Axial Compliance (Z axis)	0.531 in.	13.5 mm
Weight	4.6 lbs.	2.1 Kg
Pressure Range (locked cylinder)	30-145 psi	2-10 bar
Cylinder bore	3.38 in.	86 mm
Displacement	2.22 in.^{3}	36.5 cm^3
Temperature Range	-30°~180° F	-35°~80° C
Repeatability	±0.003 in.	±0.08 mm
Valve required to actuate	3-way, 2-position	

UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Dimensions are symmetrical about centerline

Third Angle Projection

All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]

Metric Threads Course Pitch

Imperial in.	**Metric [mm]**
0.00 = ± .01	[0.] = [± .25]
0.000 = ± .005	[0.0] = [± .13]
0.0000 = ± .0005	[0.00] = [± .013]

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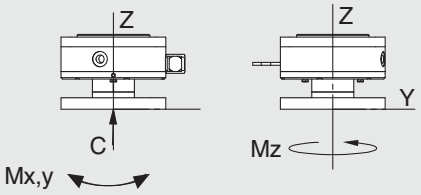


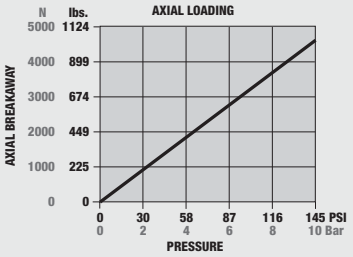
Loading Capacity at 100 psi 7 bar	Imperial	Metric
Maximum Breakaway Compressive **C**	712 lbs.	3170 N
Maximum Breakaway Moment **Mx**	522 in.-lbs	59 Nm
Maximum Breakaway Moment **My**	345 in.-lbs	39 Nm
Maximum Breakaway Moment **Mz**	522 in.-lbs	59 Nm

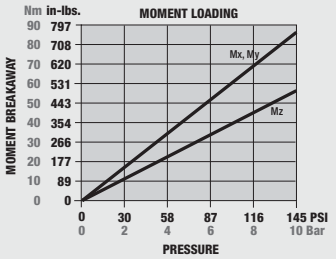
How to Order: (Order Accessories separately from Basic Model)

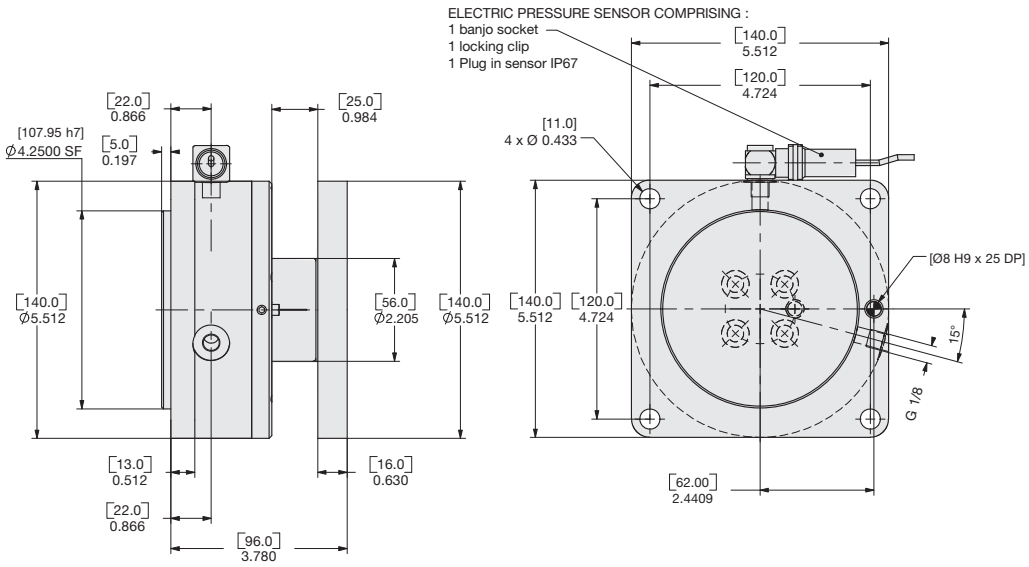
BASIC MODEL

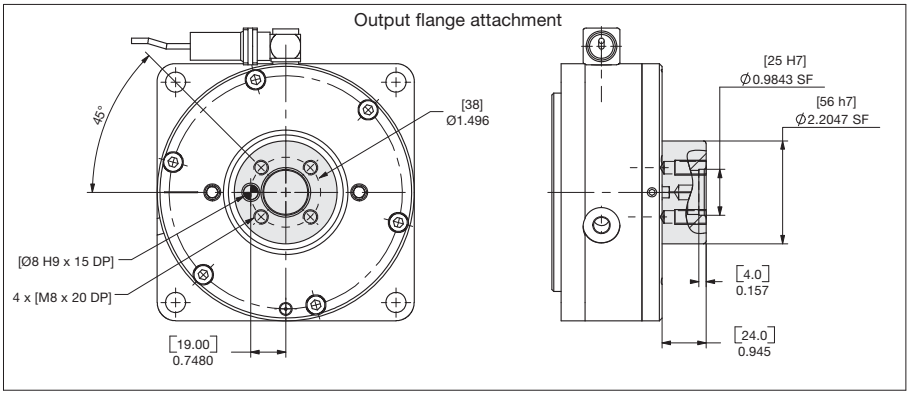
AU-110

Maximum Overload









Specifications	AU-140	
Maximum Payload	38.6 lbs.	17.5 Kg
Rotational Compliance (X and Y axis)	12°	12°
Rotational Compliance (Z axis)	45°	45°
Axial Compliance (Z axis)	0.63 in.	16 mm
Weight	8.8 lbs.	4.0 Kg
Pressure Range (locked cylinder)	30-145 psi	2-10 bar
Cylinder bore	4.25 in.	108 mm
Displacement	3.31 $in.^3$	54.3 cm^3
Temperature Range	-30°~180° F	-35°~80° C
Repeatability	±0.004 in.	±0.1 mm
Valve required to actuate	3-way, 2-position	

UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Dimensions are symmetrical about centerline

Third Angle Projection

All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]

Metric Threads Course Pitch

Imperial in.	Metric [mm]
0.00 = ± .01	[0.] = [± .25]
0.000 = ± .005	[0.0] = [± .13]
0.0000 = ± .0005	[0.00] = [± .013]

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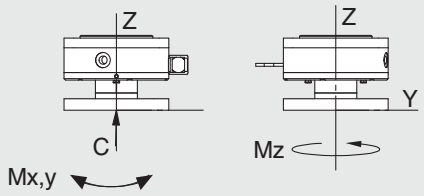


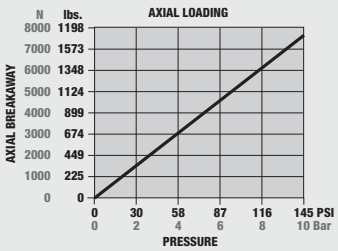
Loading Capacity at 100 psi 7 bar	Imperial	Metric
Maximum Breakaway Compressive **C**	1178 lbs.	5240 N
Maximum Breakaway Moment **Mx**	1584 in.-lbs	179 Nm
Maximum Breakaway Moment **My**	1221 in.-lbs	138 Nm
Maximum Breakaway Moment **Mz**	1584 in.-lbs	179 Nm

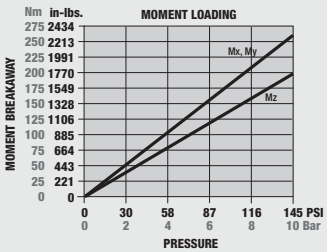
How to Order: (Order Accessories separately from Basic Model)

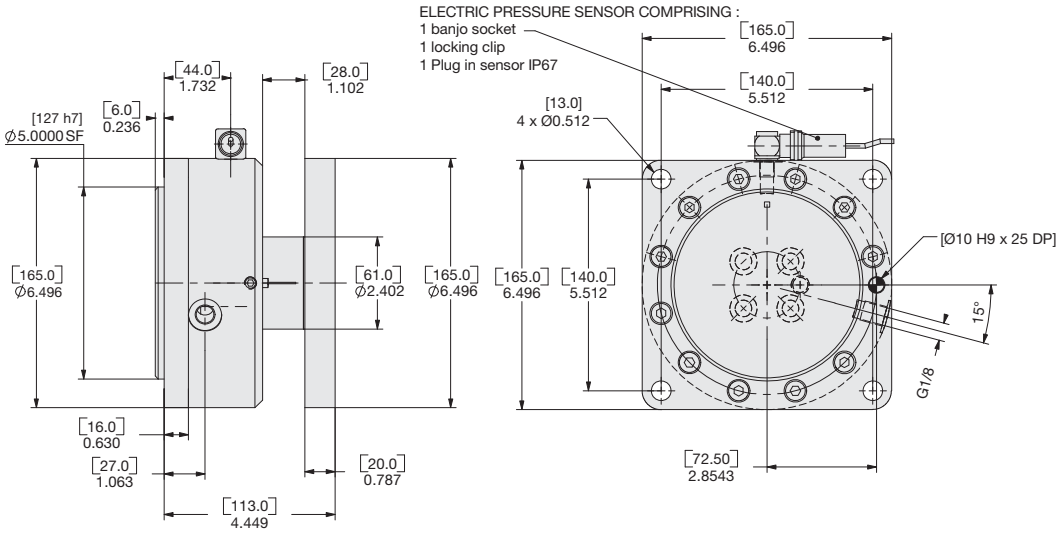
BASIC MODEL

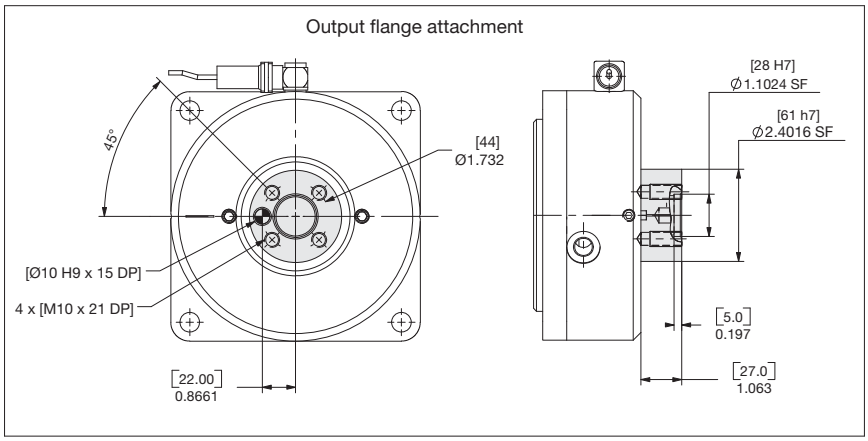
AU-140

Maximum Overload









Specifications	AU-165	
Maximum Payload	48.5 lbs.	22.0 Kg
Rotational Compliance (X and Y axis)	12°	12°
Rotational Compliance (Z axis)	24°	24°
Axial Compliance (Z axis)	0.67 in.	17 mm
Weight	12.7 lbs.	5.8 Kg
Pressure Range (locked cylinder)	30-145 psi	2-10 bar
Cylinder bore	4.76 in.	121 mm
Displacement	3.94 in.3	64.6 cm3
Temperature Range	-30°~180° F	-35°~80° C
Repeatability	±0.005 in.	±0.12 mm
Valve required to actuate	3-way, 2-position	

UNLESS OTHERWISE NOTED ALL TOLERANCES ARE AS SHOWN BELOW

Dimensions are symmetrical about centerline

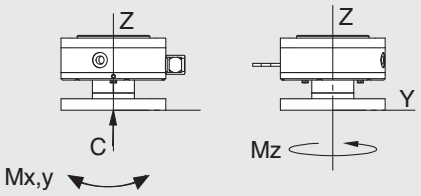
Third Angle Projection

All Dowel Holes are SF (Slip Fit). Locational Tolerance ±.0005" or [±.013mm]

Metric Threads Course Pitch

Imperial in.	Metric [mm]
0.00 = ± .01	[0.] = [± .25]
0.000 = ± .005	[0.0] = [± .13]
0.0000 = ± .0005	[0.00] = [± .013]

Loading Information



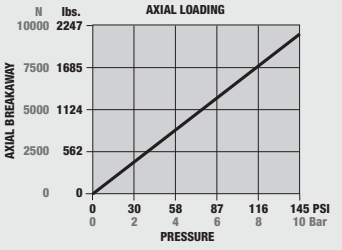
Loading Capacity at 100 psi 7 bar	Imperial	Metric
Maximum Breakaway Compressive **C**	1472 lbs.	6550 N
Maximum Breakaway Moment **Mx**	1956 in.-lbs	221 Nm
Maximum Breakaway Moment **My**	1584 in.-lbs	179 Nm
Maximum Breakaway Moment **Mz**	1956 in.-lbs	221 Nm

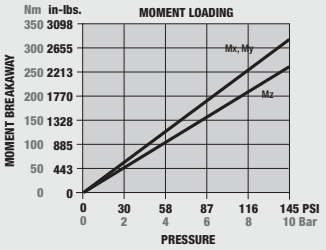
How to Order: (Order Accessories separately from Basic Model)

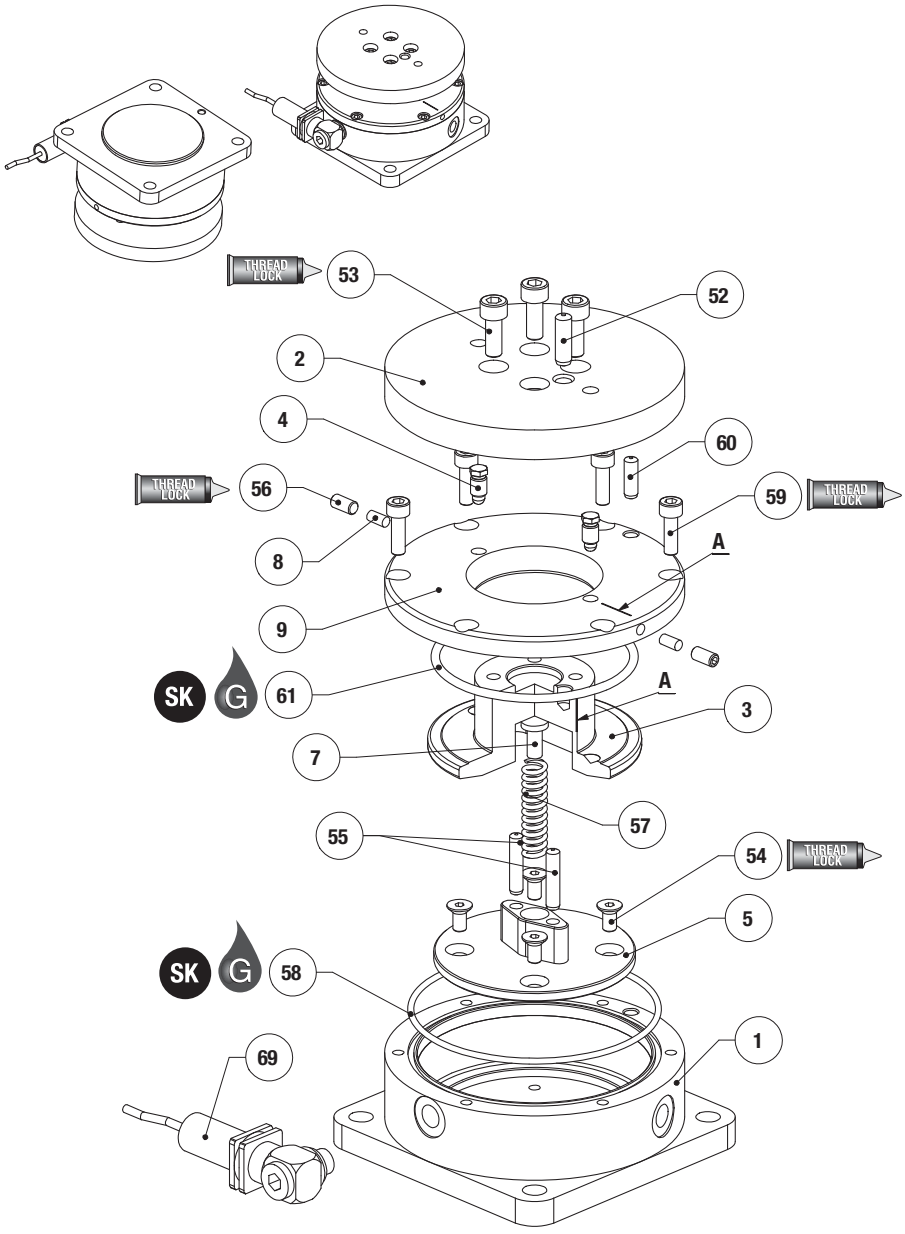
BASIC MODEL

AU-165

Maximum Overload







Item	Qty	Name
1	1	Body
2	1	Blank Plate
3	1	Output Flange
4	2	Spherical pin
5	1	Stop
7	1	Spring cap
8	2	Cylindrical spacer
9	1	Cap
52	1	Pin, Output flange
53	4	SHC screw, Flange
54	4	Hexagon CSKH screw, Stop
55	2	Pin, Stop
56	2	SS screw, Cylindrical pin
57	1	Spring
58	1	O-ring, Cap
59	6	SHC screw, Cap
60	1	Pin, Cap
61	1	O-ring, output flange
69	1	Electric pressure sensor

NOTE: Contact the Robohand Sales Department for a complete spare parts list with order numbers and prices.

Assembly Procedures

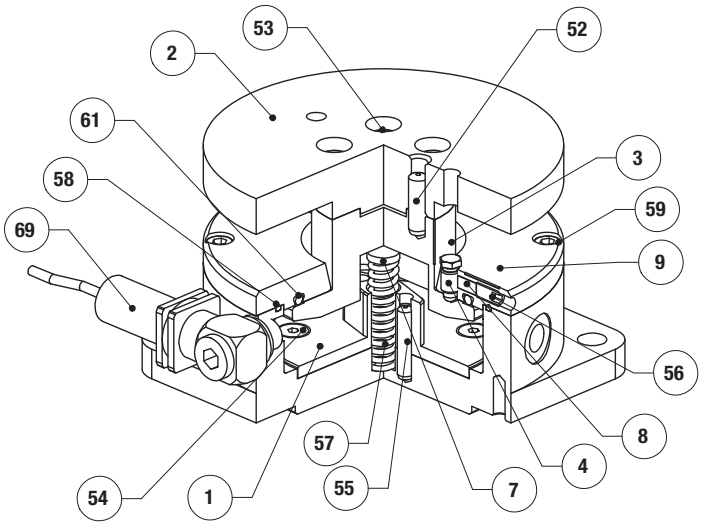
1) Locate the stop (#5) using the two pins (#55) into the body (#1)
2) Fasten the stop (#5) with (#54) screws with thread locker
3) Install the spring (#57) into the stop hole
4) Insert the spring cap (#7) into the spring (#57)
5) Insert the O-Ring (#58) into the top groove of the body (#1)
6) Screw the spherical pin (#4) into the cap (#9)
7) Insert the cylindrical spacer (#8) into the lateral holes of the cap (#9)
8) Fasten the SS screws (#56) into the lateral tapped holes of the cap (#9)
9) Insert the O-Ring (#61) into the groove of the cap (#9)
10) Insert the output flange (#3) into the cap (#9) lining up the engraved signs "A"
11) Insert this subassembly into the body (#1) and locate it using (#60) pin
12) Fasten the cap (#9) with (#59) SH screws with thread locker
13) Locate the blank plate (#2) onto the output flange (#3) using the dowel pin (#52)
14) Fasten the blank plate (#2) with (#53) SH screws with thread locker
15) Screw the electric pressure sensor (#69) in the body (#1)

Adjustment Procedures

For an easier adjustment, the blank plate (#2) can be disassembled. It is also advised to supply the module with two bar air pressure.

1) Unscrew the SS screws (#56) to release the cylindrical spacer (#8)
2) Unscrew the spherical pin (#4) to release the contact with the conical seats of the output flange (#3).
3) Line up the engraved "A" sign of the body (#1) and the output flange (#3)
4) Screw, simultaneously, by successive quarter of turn, the spherical pin (#4) till getting a contact into the conical seats of the output flange (#3). Repeat this operation until getting a minimal angular freedom.
5) Fasten the SS screws (#56) into the lateral tapped holes of the cap (#9).

SK — Seal Kit Items
THREAD LOCK — Thread Locker
KRYTOX — Krytox™ Lubricant
O — Lightweight Machine Oil
G — Teflon™ Based Grease
GLUE — Super Bonder
Third Angle Projection



Item	Qty	Name
1	1	Body
2	1	Blank Plate
3	1	Output Flange
4	2	Spherical pin
5	1	Stop
7	1	Spring cap
8	2	Cylindrical spacer
9	1	Cap
52	1	Pin, Output flange
53	4	SHC screw, Flange
54	4	Hexagon CSKH screw, Stop
55	2	Pin, Stop
56	2	SS screw, Cylindrical pin
57	1	Spring
58	1	O-ring, Cap
59	6	SHC screw, Cap
60	1	Pin, Cap
61	1	O-ring, output flange
69	1	Electric pressure sensor

NOTE: Contact the Robohand Sales Department for a complete spare parts list with order numbers and prices.

SK Seal Kit Items
THREAD LOCK Thread Locker
KRYTOX Krytox™ Lubricant
O Lightweight Machine Oil
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DESIGN NOTES