Tool Changers

RAD

ROBOTIC ACCESSORIES DIVISION

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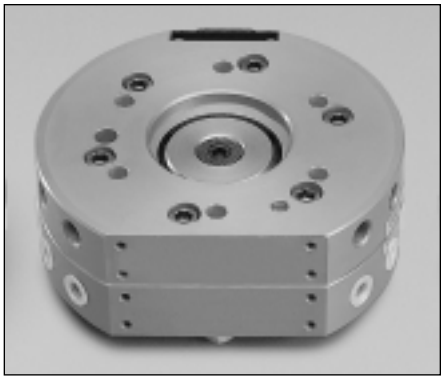
- ✔ Extremely High Repeatability
- ✔ High Rigidity
- ✔ Superior Fail-Safe Locking Mechanism
- ✔ Excellent Reliability



Robotic Accessories
Tool Changer

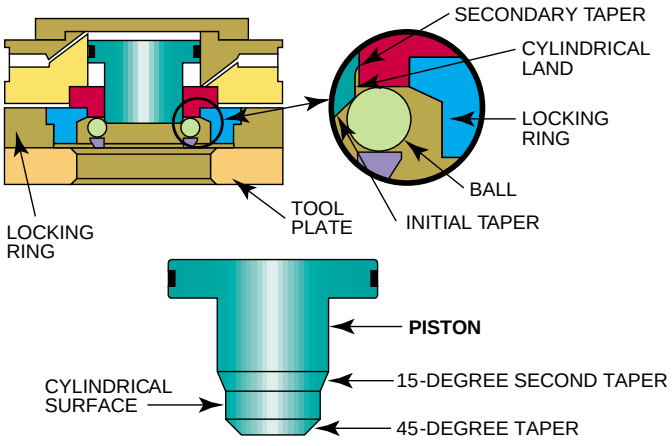
Operating Principle

The tool changer uses a pneumatic piston, located in the master plate, to force steel balls into engagement with the lock ring on the tool plate. Double tapers in the piston insure concentricity repeatability while protecting the tool from disengagement in the event locking pressure is lost. Pressure must be applied to the unlocking port to release the tool plate.

Features

- Unmatched Repeatability–The unique double-taper locking piston in combination with the two locating pins provides unmatched repeatability. Million-cycle testing, at rated loads, shows that the typical repeatability is much better than the guaranteed values shown in the specifications.
- High Rigidity–The tool changer has a large moment capacity due to the locking piston's high coupling strength and large diameter. Because the coupled tool changer does not rock during high-inertia moves, locking failure and repeatability problems are prevented.
- Excellent Reliability–The patented double-taper locking mechanism actually self-compensates for wear. The pneumatic ports use uniquely designed, long-life rubber bushings which prevent any loss of air pressure. Spring probe electrical pins on the Master Plate insure contact with fixed pins in the Tool Plate. Simply put, this Tool Changer is built to last.
- Superior Fail-Safe Locking Mechanism–The new patented locking mechanism locks the Master Plate to the Tool Plate and remains locked even if pressure is accidentally removed. The built-in fail-safe feature eliminates the need for a spring.
- No-Touch Locking™ Technology
  The tool changer can lock successfully with a gap between the master and tool plates.

Design of Locking Mechanism



- Available in Ten Sizes–The Tool Changer accommodates payloads ranging from 5 to 455 kg. Standard models include as many as 74 electrical lines and 14 pneumatic ports.
- 3 year warranty–Based on years of observation and analysis by our customers in the field, and extensive laboratory testing.
- Long-life bushings for pneumatic pass-through.
- Small size and weight to payload ratio.
- All locking parts are made of R_c58 stainless steel.
- Maximum pressure of 100 psi (7 bar).

Specifications

Additional Specifications

1. The Z-axis force must be less than the coupling force to achieve the specified repeatability.
2. The Master Plate can only be decoupled if air pressure is applied to the Unlock port, even if Z-axis force exceeds the coupling force.
3. Extra electrical contact option and extra pneumatic line option cannot be provided together.
4. Special Tool Changer models and options are available. Call for details.
5. Interface plates are available for any robot model.

Tool Changer Model Number

Specification Description	TC-5 Page 6	TC-11 Page 7	TC-20 Page 8	TC-21 Page 9	TC-40 Page 10	TC-41 Page 11	TC-60 Page 12	TC-71 Page 13	TC-100 Page 14	TC-150 Page 15	TC-300 Page 16
Static Moment Capacity (X& Y) **(English, lb-in)**	**110**	**220**	**500**	**500**	**1390**	**1390**	**1740**	**3500**	**6940**	**10400**	**29100**
Static Moment Capacity (X& Y) **(Metric, N-m)**	**12.5**	**25**	**56.5**	**56.5**	**157**	**157**	**197**	**395**	**784**	**1175**	**3289**
Static Moment Capacity (Z) **(English, lb-in)**	**150**	**300**	**690**	**690**	**1910**	**1910**	**2600**	**3500**	**6940**	**9000**	**25000**
Static Moment Capacity (Z) **(Metric, N-m)**	**17**	**34**	**78**	**78**	**216**	**216**	**294**	**395**	**784**	**1017**	**2825**
Pneumatic Pass-Through (Qty) Size	(6) M5 or #10-32	(6) M5 or #10-32	(12) M5 or #10-32	(8)† 1/8 NPT	(8)† 1/8 NPT	(6) 3/8 NPT (4) 1/8 NPT	(8)† 1/8 NPT	(8)† 1/4 NPT	(8)† 3/8 NPT	(10)† 3/8 NPT	(10)† 3/8 BSPT
Pneumatic Lock & Unlock Port Size	M5 or #10-32	M5 or #10-32	M5 or #10-32	M5 or #10-32	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT	1/4 BSPT

†Additional pneumatic pass-through ports are available for these models.
All models can handle a dynamic moment 3X higher than the static moment capacity. Moment tests show failure point at 12 times X & Y static moment specifications.

MODEL TC-5

Payload Capacity–*kg/lbs*. 8/18
Static Moment X & Y Resistance†–*Nm/lb-in* 12.5/110
Static Moment Z Resistance†–*Nm/lb-in*. 17/150
Positional Repeatability X, Y & Z–*mm/in* 0.010/0.0004
Weight when Coupled–*kg/lb* 0.36/0.8
Locking Force @ 80 psi (5.5 bar)–*N/lb* 690/155

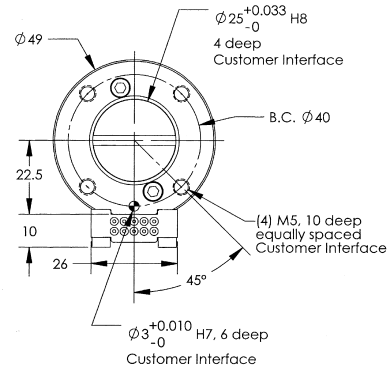
Diameter when Coupled–*mm/in* 49/1.9
Height when Coupled–*mm/in* 48.5/1.9
Pneumatic Port Type–Pass Through (6) . . . . . M5 or #10-32
Pneumatic Port–"Lock" & "Unlock" M5
Min./Max. Allowable Distance Between
Plates before Locking-*mm/in* 1.5-3.0/0.06-0.12

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

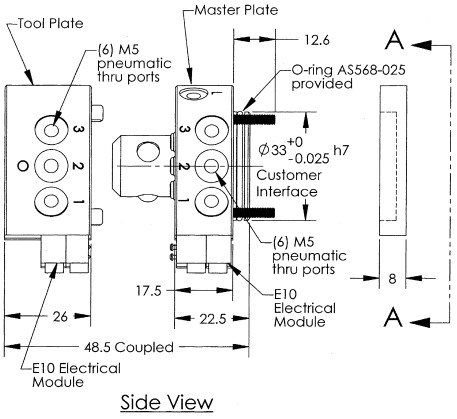
Special Feature: Master forces separation of tool to prevent sticking while unlocking–a common problem when working with light payloads.

Options

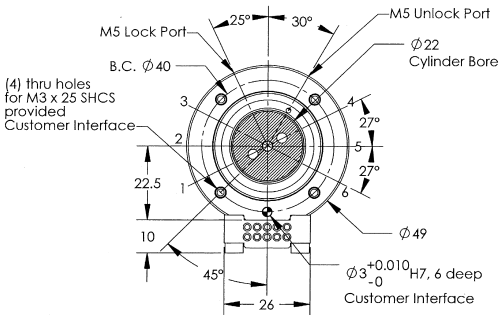
Option	# Pins	Electrical Rating	Description	Comments
E10	10	3A/150V	Solder connection, miniature size	Gold-plated contact pins
E20	20	3A/150V	Solder connection, miniature size	Gold-plated contact pins
E30	30	3A/150V	Solder connection, miniature size	Gold-plated contact pins
B15	15	3A/50V	High density D-sub connector	Gold-plated contact pins
SIP	N/A	N/A	Lock/unlock sensing	See page 19



Bottom View Tool Plate



Side View



Top View Master Plate
Without Cover Plate

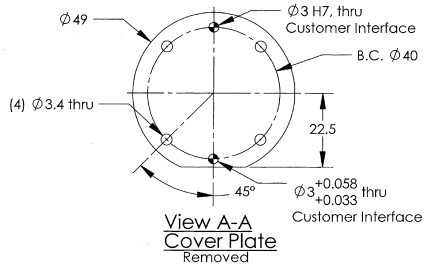
Interface Advice:
The robot interface plate should be designed to use M3 screws, Ø3 dowel pin and the Ø33 boss. Reference Note 4.

Interface Advice:
The tool interface plate should be designed to use M5 screws Ø3 dowel pin and the Ø 25 recess.

ALL DIMENSIONS ARE IN MM

Warning:
Do not apply unlock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

Notes:
1. When coupling, maintain a gap between 1.5mm and 3mm.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. When the cover plate is utilized, (2) Ø3 dowel pins are required.
4. Orientation marks are provided to assist in robot teaching.



View A-A
Cover Plate
Removed

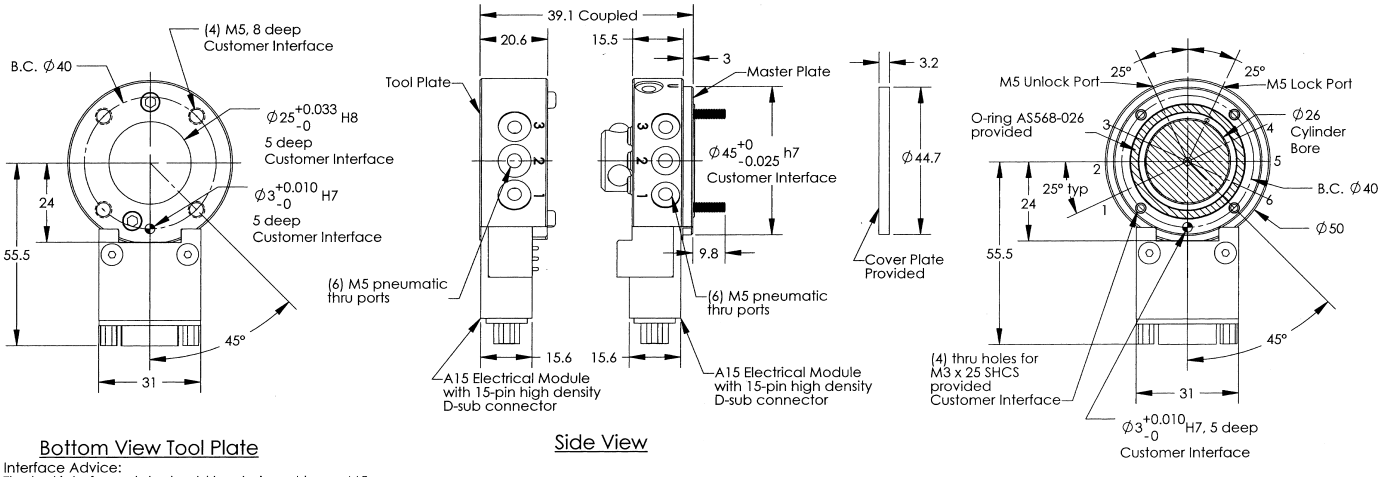
MODEL TC-11

Payload Capacity–*kg/lbs*. 16/35
Static Moment X & Y Resistance†–*Nm/lb-in* 25/220
Static Moment Z Resistance†–*Nm/lb-in*. 34/300
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 0.33/0.7
Locking Force @ 80 psi (5.5 bar)–*N/lb* 1068/240
Diameter when Coupled–*mm/in*. 50/1.9
Height when Coupled–*mm/in* 39.1/1.5
Pneumatic Port Type–Pass Through (6) . . . . . M5 or #10-32
Pneumatic Port–"Lock" & "Unlock" M5
Max. Allowable Distance Between
Plates before Locking-*mm/in* 3.0/0.12

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Options

Option	# Pins	Electrical Rating	Description	Comments
A15	15	3A/50V	High-density D-sub connector	Gold-plated contact pins
E10	10	3A/150V	Solder connection, miniature size	Gold-plated contact pins
E20	20	3A/150V	Solder connection, miniature size	Gold-plated contact pins
SIP	N/A	N/A	Lock/unlock sensing	See page 19



Bottom View Tool Plate

Interface Advice:
The tool interface plate should be designed to use M5 screws Ø3 dowel pin and the Ø 25 recess.

Side View

Top View Master Plate
Without Cover Plate

Interface Advice:
The robot interface plate should be designed to use M3 screws, Ø3 dowel pin and the Ø45 boss. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

ALL DIMENSIONS ARE IN MM

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

MODEL TC-20

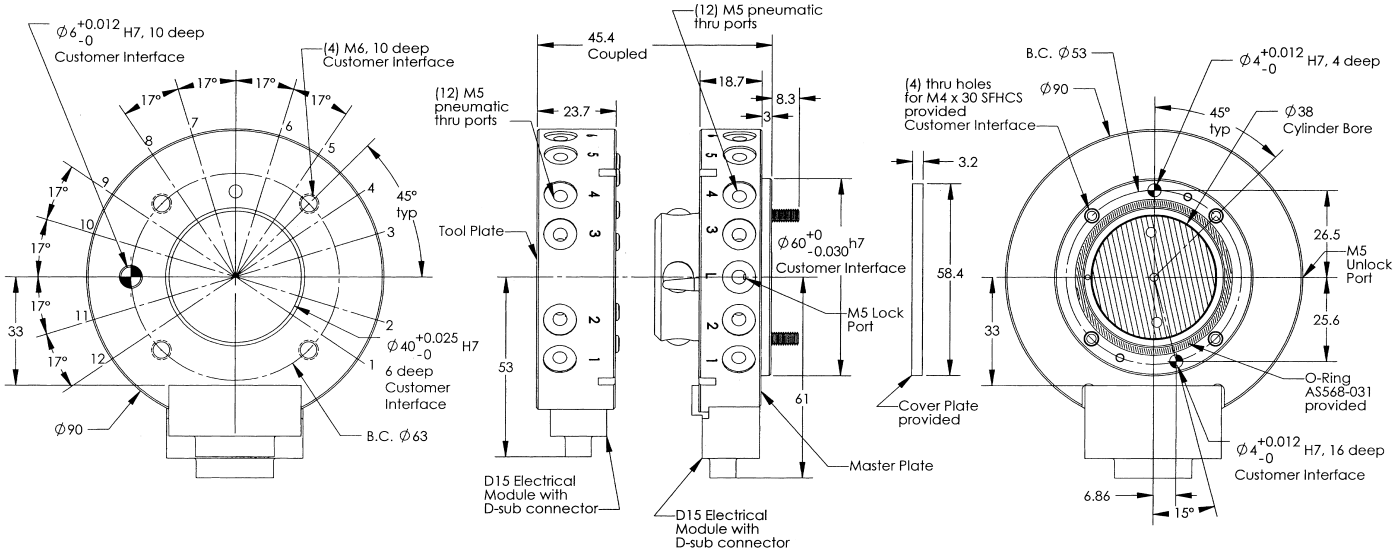
Payload Capacity–*kg/lbs*. 25/55
Static Moment X & Y Resistance†–*Nm/lb-in*. 56.5/500
Static Moment Z Resistance†–*Nm/lb-in*. 78/690
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 0.85/1.9
Locking Force @ 80 psi (5.5 bar)–*N/lb* 2314/520

Diameter when Coupled–*mm/in*. 90/3.5
Height when Coupled–*mm/in* 45.4/1.8
Pneumatic Port Type–Pass Through (12) . . . . . M5 or #10-32
Pneumatic Port–"Lock" & "Unlock" . . . . . M5 or #10-32
Max. Allowable Distance Between
Plates before Locking-*mm/in* 3.0/0.12

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Options

Option	# Pins	Electrical Rating	Description	Comments
D15	15	3A/150V	D-sub connector, miniature size	Gold-plated contact pins
K19	19	3A/50V	MS miniature quick-disconnect connector	Sealed, no-touch master pins
K26	26	3A/50V	MS miniature quick-disconnect connector	Sealed, no-touch master pins
SIP	N/A	N/A	Lock/unlock sensing	See page 19



Bottom View Tool Plate

Interface Advice:
The tool interface plate should be designed to use M6 screws Ø6 dowel pin and the Ø40 recess.

Side View

Top View Master Plate Without Cover Plate

Interface Advice:
The robot interface plate should be designed to use M4 screws, Ø4 dowel pin and the Ø60 boss. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

ALL DIMENSIONS ARE IN MM

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

MODEL TC-21

Payload Capacity–*kg/lbs*. 25/55
Static Moment X & Y Resistance†–*Nm/lb-in*. 56.5/500
Static Moment Z Resistance†–*Nm/lb-in*. 78/690
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 0.85/1.9
Locking Force @ 80 psi (5.5 bar)–*kg/lb*. 2314/520

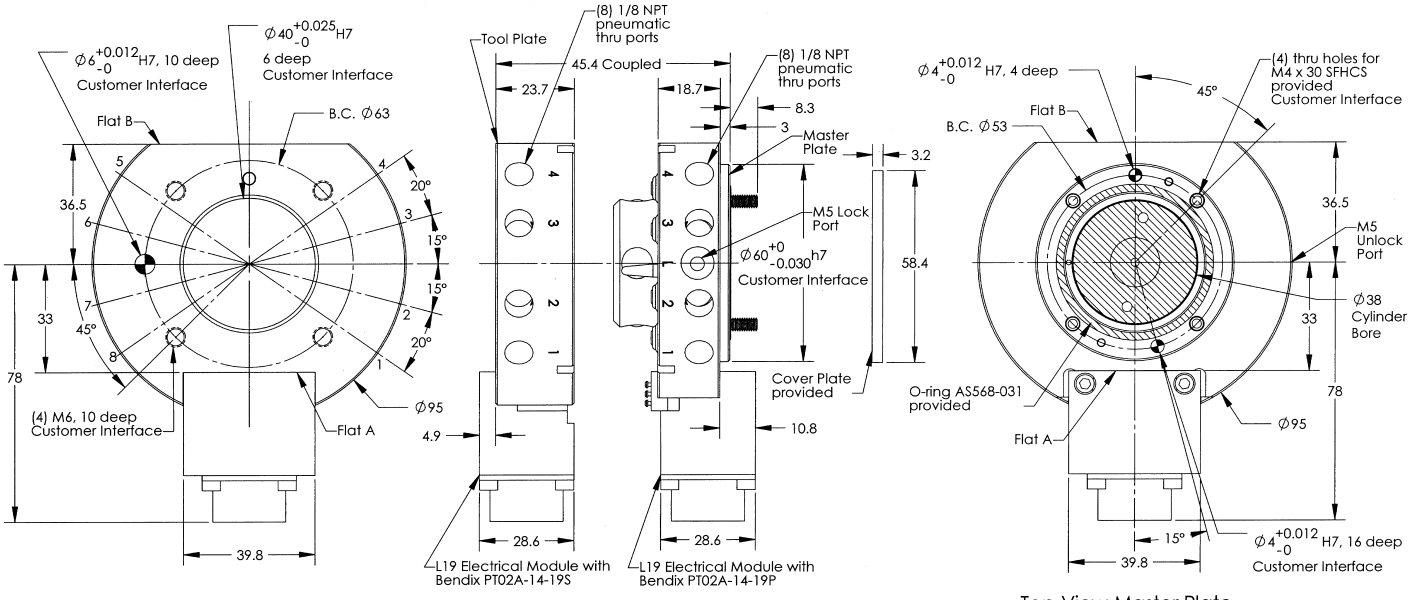
Diameter when Coupled–*mm/in*. 95/3.7
Height when Coupled–*mm/in* 45.4/1.8
Pneumatic Port Type–Pass Through (8) . . . . . 1/8 NPT
Pneumatic Port–"Lock" & "Unlock" . . . . . M5 or #10-32
Max. Allowable Distance Between
Plates before Locking-*mm/in* 3.0/0.12

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Special Feature: Large 1/8 NPT ports in a small, lightweight package.

Options

Option	# Pins	Electrical Rating	Description	Comments
D15	15	3A/150V	D-sub connector, miniature size	Gold-plated contact pins
K19	19	3A/50V	MS miniature quick-disconnect connector	Sealed, no-touch master pins
K26	26	3A/50V	MS miniature quick-disconnect connector	Sealed, no-touch master pins
SIP	N/A	N/A	Lock/unlock sensing	See page 19



Bottom View Tool Plate

Interface Advice:
The tool interface plate should be designed to use M6 screws, Ø6 dowel pin and Ø40 recess.

Side View

Top View Master Plate Without Cover Plate

Interface Advice:
The robot interface plate should be designed to use M4 screws, Ø4 dowel pin and Ø60 boss. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

ALL DIMENSIONS ARE IN MM

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

MODEL TC-40

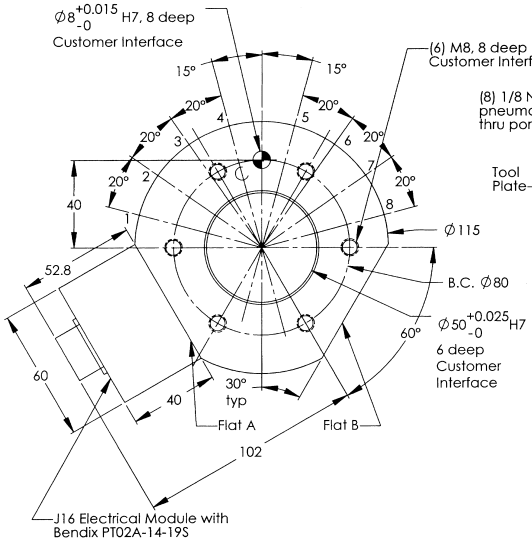
Payload Capacity–*kg/lbs* 50/110
Static Moment X & Y Resistance†–*Nm/lb-in* 157/1390
Static Moment Z Resistance†–*Nm/lb-in* 216/1910
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 1.8/3.9
Locking Force @ 80 psi (5.5 bar)–*N/lb* 4540/1020

Diameter when Coupled–*mm/in* 115/4.5
Height when Coupled–*mm/in* 57/2.2
Pneumatic Port Type–Pass Through (8) . . . . . 1/8 NPT
Pneumatic Port–"Lock" & "Unlock" . . . . . 1/8 NPT
Max. Allowable Distance Between
Plates before Locking-*mm/in* 5.0/0.20

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

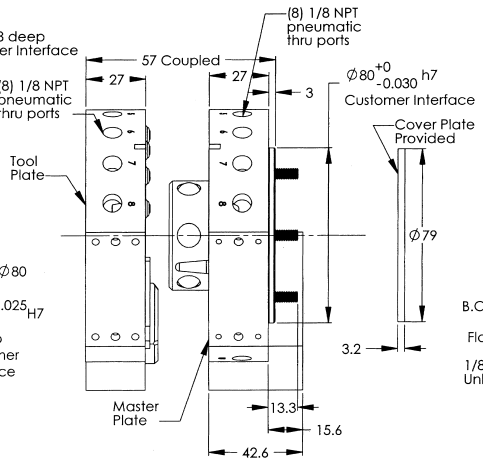
Options

Option	# Pins	Electrical Rating	Description	Comments
MT8	8	20A/500V	MS cylindrical, threaded connector	Sealed, no-touch master pins
S19/S26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
R19/R26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
J16	16	5A/250V	MS miniature quick-disconnect connector	Serrated rhodium-plated contact pins
T19	19	5A/250V	MS cylindrical, threaded connector	Fluid resistant, untouchable master pins
F02/F04	—	—	(2) or (4) 3/8 G/NPT self-sealing ports	For fluid or pneumatic pass-through
P18	—	—	Additional (4) 1/8 NPT pneumatic ports	Provides a total of 12 pneumatic ports
P14	—	—	Additional (2) 1/4 NPT pneumatic ports	Provides a total of 10 pneumatic ports
V34	—	—	3/4 G vacuum port	Vacuum only
SIP	—	—	Lock/unlock sensing	See page 19

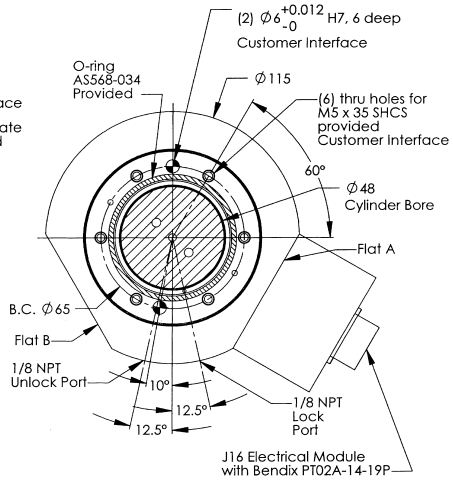


Bottom View Tool Plate

Interface Advice:
The tool interface plate should be designed to use M8 screws, Ø8 dowel pin and Ø50 recess.



Side View



Top View Master Plate Without Cover Plate

Interface Advice:
The robot interface plate should be designed to use M5 screws, Ø6 dowel pin and Ø80 boss. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

ALL DIMENSIONS ARE IN MM

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

MODEL TC-41

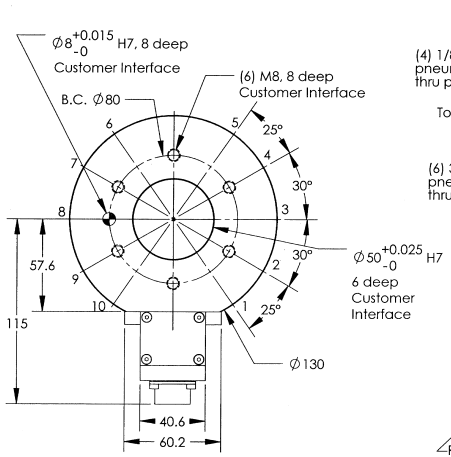
Payload Capacity–*kg/lbs* 50/110
Static Moment X & Y Resistance†–*Nm/lb-in* 157/1390
Static Moment Z Resistance†–*Nm/lb-in* 216/1910
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 2.2/4.8
Locking Force @ 80 psi (5.5 bar)–*N/lb* 4540/1020
Diameter when Coupled–*mm/in* 130/5.12
Height when Coupled–*mm/in* 57/2.25
Pneumatic Port Type–Pass Through (6) . . . . . 3/8 NPT
(4) . . . . . 1/8 NPT
Pneumatic Port–"Lock" & "Unlock" . . . . . 1/8 NPT
Max. Allowable Distance Between
Plates before Locking-*mm/in* 5.0/0.20

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Special Feature: Large 3/8 NPT ports.

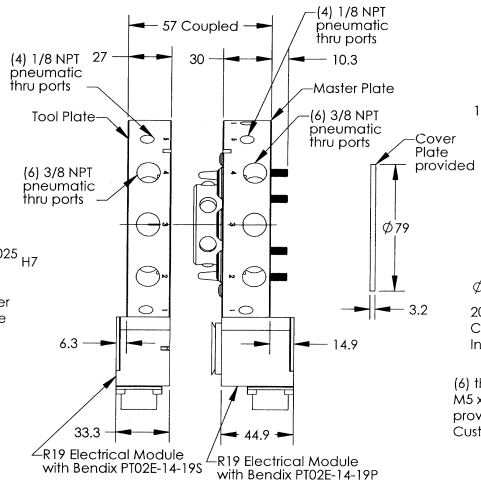
Options

Option	# Pins	Electrical Rating	Description	Comments
MT8	8	20A/500V	MS cylindrical, threaded connector	Sealed, no-touch master pins
S19/S26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
R19/R26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
J16	16	5A/250V	MS miniature quick-disconnect connector	Serrated rhodium-plated contact pins
T19	19	5A/250V	MS cylindrical, threaded connector	Fluid resistant, untouchable master pins
F02/F04	—	—	(2) or (4) 3/8 G/NPT self-sealing ports	For fluid or pneumatic pass-through
P18	—	—	Additional (4) 1/8 NPT pneumatic ports	Provides a total of 14 pneumatic ports
P14	—	—	Additional (2) 1/4 NPT pneumatic ports	Provides a total of 12 pneumatic ports
V34	—	—	3/4 G vacuum port	Vacuum only
SIP	—	—	Lock/unlock sensing	See page 19

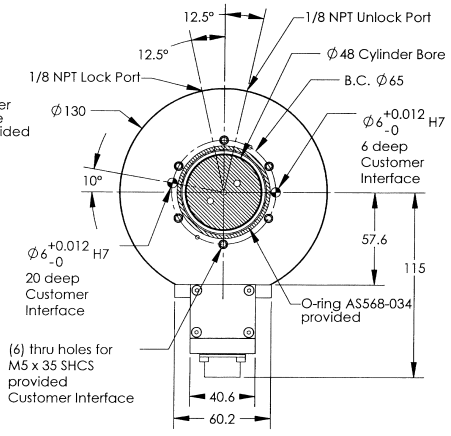


Bottom View Tool Plate

Interface Advice:
The tool interface plate should be designed to use M8 screws, Ø8 dowel pin and Ø50 recess.



Side View



Top View Master Plate Without Cover Plate

Interface Advice:
The robot interface plate should be designed to use M5 screws, and Ø6 dowel pins. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

ALL DIMENSIONS ARE IN MM

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth with cover plate is 2.5mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

MODEL TC-60

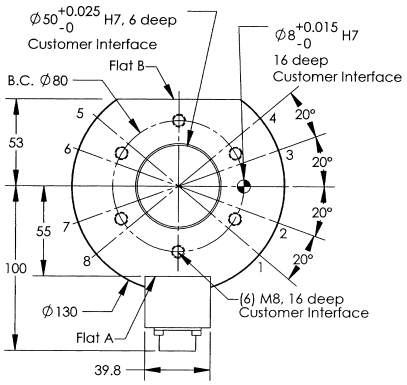
Payload Capacity–*kg/lbs*. 75/165
Static Moment X & Y Resistance†–*Nm/lb-in* 197/1740
Static Moment Z Resistance†–*Nm/lb-in*. 294/2600
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 2.06/4.5
Locking Force @ 80 psi (5.5 bar)–*N/lb* 7387/1660

Diameter when Coupled–*mm/in* 130/5.1
Height when Coupled–*mm/in* 50/1.9
Pneumatic Port Type–Pass Through (8) . . . . . 1/8 NPT
Pneumatic Port–"Lock" & "Unlock" . . . . . 1/8 NPT
Max. Allowable Distance Between
Plates before Locking-*mm/in* 5.0/0.20

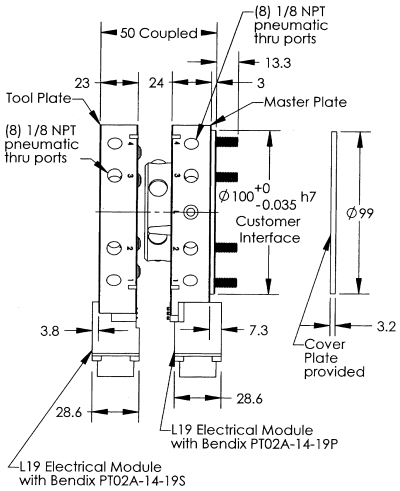
†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Options

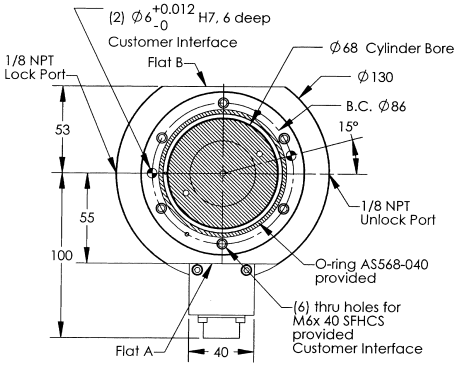
Option	# Pins	Electrical Rating	Description	Comments
D15	15	3A/50V	D-sub connector	Gold plated contact pins
K19	19	3A/50V	MS miniature quick-disconnect connector	Sealed, no-touch master pins
K26	26	3A/50V	MS miniature quick-disconnect connector	Sealed, no-touch master pins
P18	—	—	Additional (4) 1/8 NPT pneumatic ports	Provides a total of 12 pneumatic ports
SIP	—	—	Lock/unlock sensing	See page 19



Bottom View Tool Plate



Side View



Top View Master Plate
Without Cover Plate

Interface Advice:
The tool interface plate should be designed to use M8 screws, Ø8 dowel pin and Ø50 recess.

Interface Advice:
The robot interface plate should be designed to use M6 screws, Ø6 dowel pin and Ø100 boss. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

ALL DIMENSIONS ARE IN MM

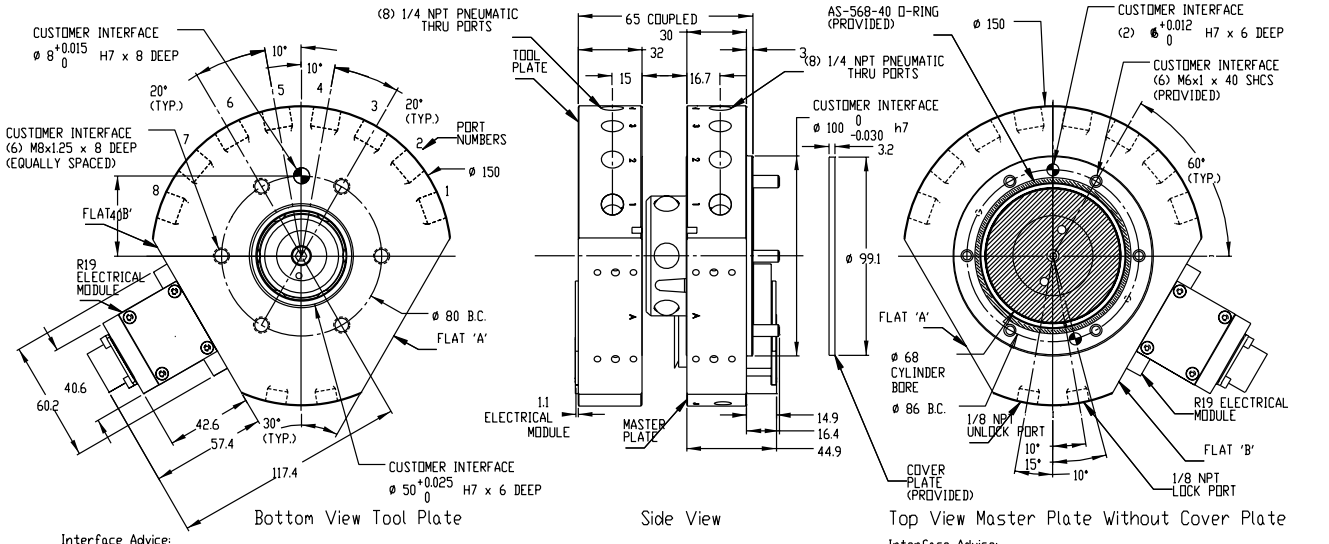
MODEL TC-71

Payload Capacity–*kg/lbs*. 79/175
Static Moment X, Y & Z Resistance†–*Nm/lb-in* 395/3500
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 3.1/6.7
Locking Force @ 80 psi (5.5 bar)–*N/lb* 8075/1815
Diameter when Coupled–*mm/in* 150/5.9
Height when Coupled–*mm/in* 65/2.6
Pneumatic Port Type–Pass Through (8) . . . . . 1/4 NPT
Pneumatic Port–"Lock" & "Unlock" . . . . . 1/8 NPT
Max. Allowable Distance Between
Plates before Locking-*mm/in* 5.0/0.20

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Options

Option	# Pins	Electrical Rating	Description	Comments
MT8	8	20A/500V	MS cylindrical, threaded connector	Sealed, no-touch master pins
S19/S26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
R19/R26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
J16	16	5A/250V	MS miniature quick-disconnect connector	Serrated rhodium-plated contact pins
T19	19	5A/250V	MS cylindrical, threaded connector	Fluid resistant, untouchable master pins
F02/F04	—	—	(2) or (4) 3/8 G/NPT self-sealing ports	For fluid or pneumatic pass-through
P14	—	—	Additional (2) 1/4 NPT pneumatic ports	Provides a total of 10 pneumatic ports
P18	—	—	Additional (4) 1/8 NPT pneumatic ports	Provides a total of 12 pneumatic ports
P38	—	—	Additional (4) 3/8 NPT pneumatic ports	Provides a total of 12 pneumatic ports
V34	—	—	3/4 G vacuum port	Vacuum only
SIP	—	—	Lock/unlock sensing	See page 19



Interface Advice:
The tool interface plate should be designed to use M8x1.25 screws, Ø8 dowel pin and <MOD-DIAM>50 recess.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without a cover plate is 2.5mm, with a cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

Interface Advice:
The robot interface plate should be designed to use M6x1 screws, Ø6 dowel pin and <MOD-DIAM>100 boss. Reference Note 3.

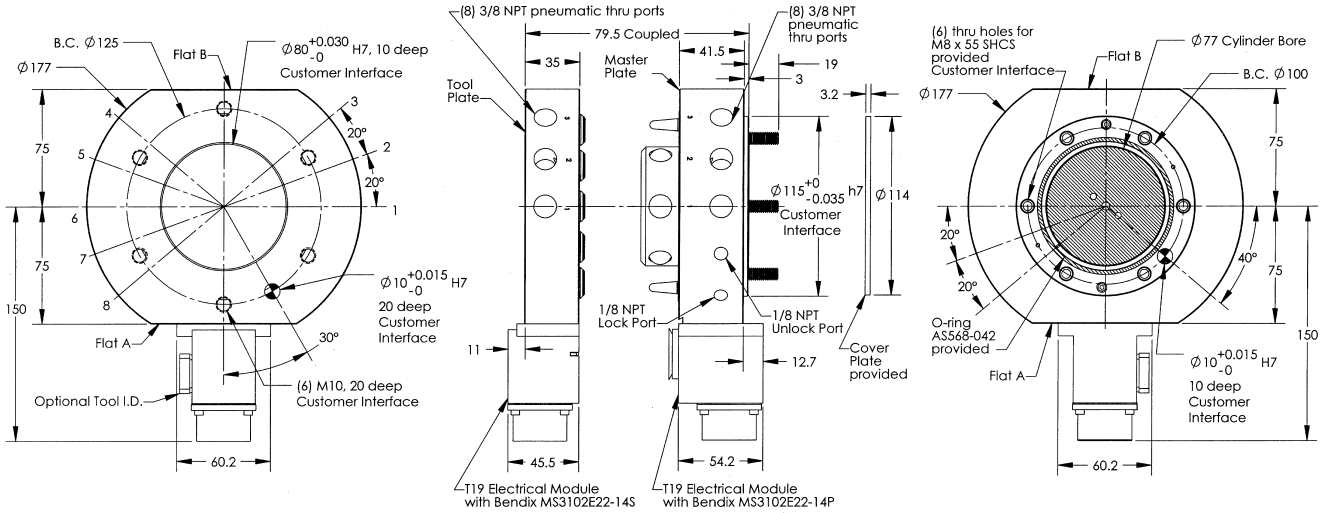
MODEL TC-100

Payload Capacity–*kg/lbs* 150/330
Static Moment X,Y & Z Resistance†–*Nm/lb-in* 784/6940
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 5.8/13
Locking Force @ 80 psi (5.5 bar)–*N/lb* 12149/2730
Diameter when Coupled–*mm/in* 177/6.9
Height when Coupled–*mm/in* 79.5/3.1
Pneumatic Port Type–Pass Through (8) . . . . . 3/8 NPT
Pneumatic Port–"Lock" & "Unlock" . . . . . 1/8 NPT
Max. Allowable Distance Between
Plates before Locking-*mm/in* 7.0/0.28

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Options

Option	# Pins	Electrical Rating	Description	Comments
MT8	8	20A/500V	MS cylindrical, threaded connector	Sealed, no-touch master pins
S19/S26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
R19/R26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
J16	16	5A/250V	MS miniature quick-disconnect connector	Serrated rhodium-plated contact pins
T19	19	5A/250V	MS cylindrical, threaded connector	Fluid resistant, untouchable master pins
F02/F04	—	—	(2) or (4) 3/8 G/NPT self-sealing ports	For fluid or pneumatic pass-through
P14	—	—	Additional (2) 1/4 NPT pneumatic ports	Provides a total of 10 pneumatic ports
P18	—	—	Additional (4) 1/8 NPT pneumatic ports	Provides a total of 12 pneumatic ports
P38	—	—	Additional (4) 3/8 NPT pneumatic ports	Provides a total of 12 pneumatic ports
V34	—	—	3/4 G vacuum port	Vacuum only
SIP	—	—	Lock/unlock sensing	See page 19



Bottom View Tool Plate

Interface Advice:
The tool interface plate should be designed to use M10 screws, Ø10 dowel pin and Ø80 recess.

Side View

Top View Master Plate Without Cover Plate

Interface Advice:
The robot interface plate should be designed to use M8 screws, Ø10 dowel pin and Ø115 boss. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without the cover plate is 2.5mm, with the cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

ALL DIMENSIONS ARE IN MM

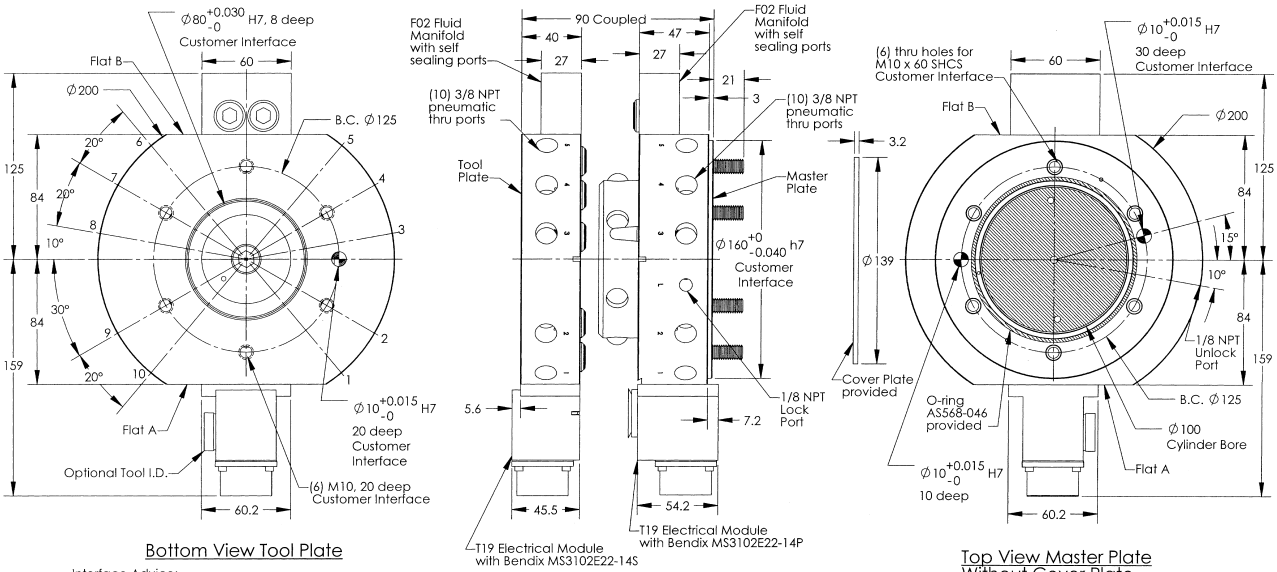
MODEL TC-150

Payload Capacity–*kg/lbs*. 200/440
Static Moment X and Y Resistance†–*Nm/lb-in* 1175/10400
Static Moment Z Resistance†–*Nm/lb-in* 1017/9000
Positional Repeatability X, Y & Z–*mm/in* 0.015/0.0006
Weight when Coupled–*kg/lb* 8.7/19.1
Locking Force @ 80 psi (5.5 bar)–*N/lb* 16109/3620
Diameter when Coupled–*mm/in*. 200/7.9
Height when Coupled–*mm/in*. 90/3.5
Pneumatic Port Type–Pass Through (10) . . . . . 3/8 NPT
Pneumatic Port–"Lock" & "Unlock" . . . . . 1/8 NPT
Max. Allowable Distance Between
Plates before Locking-*mm/in* 7.0/0.28

†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Options

Option	# Pins	Electrical Rating	Description	Comments
MT8	8	20A/500V	MS cylindrical, threaded connector	Sealed, no-touch master pins
S19/S26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
R19/R26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
J16	16	5A/250V	MS miniature quick-disconnect connector	Serrated rhodium-plated contact pins
T19	19	5A/250V	MS cylindrical, threaded connector	Fluid resistant, untouchable master pins
F02/F04	—	—	(2) or (4) 3/8 G/NPT self-sealing ports	For fluid or pneumatic pass-through
P14	—	—	Additional (2) 1/4 NPT pneumatic ports	Provides a total of 12 pneumatic ports
P18	—	—	Additional (4) 1/8 NPT pneumatic ports	Provides a total of 14 pneumatic ports
P38	—	—	Additional (4) 3/8 NPT pneumatic ports	Provides a total of 14 pneumatic ports
V34	—	—	3/4 G vacuum port	Vacuum only
SIP	—	—	Lock/unlock sensing	See page 19



Interface Advice:
The tool interface plate should be designed to use M10 screws, Ø10 dowel pin and Ø80 recess.

Interface Advice:
The robot interface plate should be designed to use M10 screws, Ø10 dowel pin and Ø160 boss. Reference Note 3.

Warning:
Do not apply lock air pressure without master interface plate properly attached; otherwise, damage may occur to cover plate and o-ring.

Notes:
1. Optional electrical module shown; consult catalog for other options.
2. Mounting hardware is provided; cover plate, o-ring and master plate screws.
3. Cover plate is not necessary if robot interface plate provides sealing. The recommended interface plate bore depth without the cover plate is 2.5mm, with the cover plate is 5.6mm.
4. Orientation marks are provided to assist in robot teaching.
5. Misalignments allowed when coupling; consult specifications.
6. DXF, DWG and IGES images available upon request.

MODEL TC-300

Payload Capacity–*kg/lbs*. 455/1003
Static Moment X and Y Resistance†–*Nm/lb-in* 3289/29100
Static Moment Z Resistance†–*Nm/lb-in* 2825/25000
Positional Repeatability X, Y & Z–*mm/in*. 0.015/0.0006
Weight when Coupled–*kg/lb* 20.1/44.2
Locking Force @ 80 psi (5.5 bar)–*N/lb*. 35333/7940

Diameter when Coupled–*mm/in* 259/10.2
Height when Coupled–*mm/in*. 116/4.6
Pneumatic Port Type–Pass Through (10). . . . . 3/8 BSPT
Pneumatic Port–"Lock" & "Unlock" . . . . . 1/4 BSPT
Max. Allowable Distance Between
Plates before Locking-*mm/in* 10.0/0.40

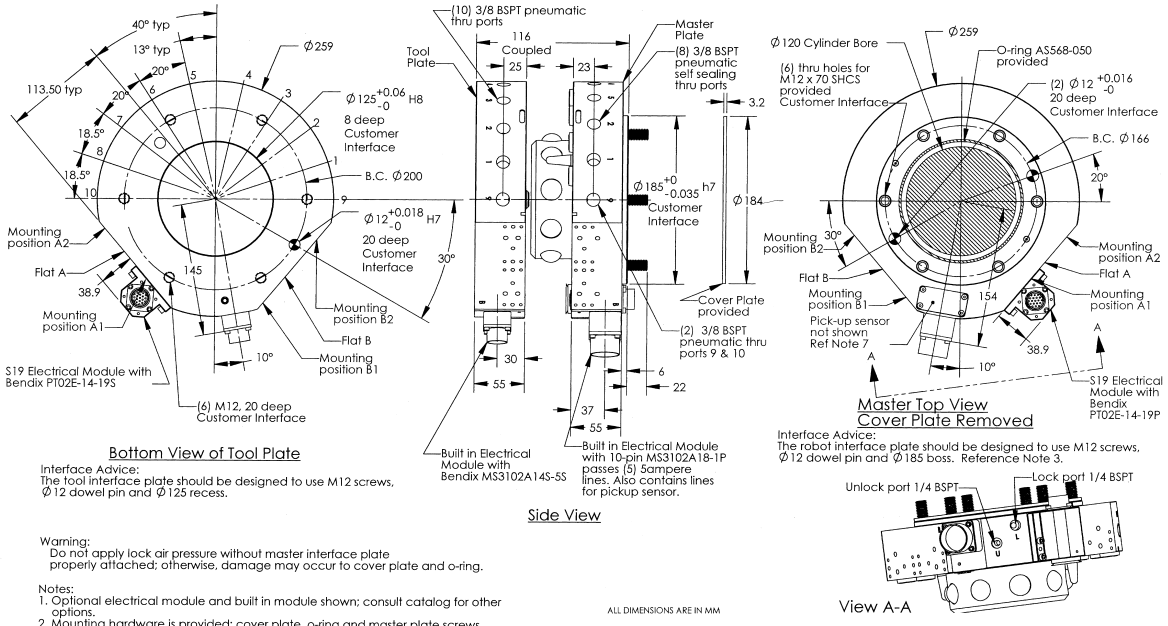
†Can handle a dynamic moment 3 times higher than the static moment capacity. Moment tests show failure point at 12 times static moment specifications.

Special Features: Standard electrical module has five pins that may be used for tool ID. The master connector contains the signals for the detection sensor. The detection sensor detects when the tool plate is within 1.5mm of the master plate, signaling ready to lock.

Self-sealing pneumatic ports on the master side seal when the master and tool separate.

Options

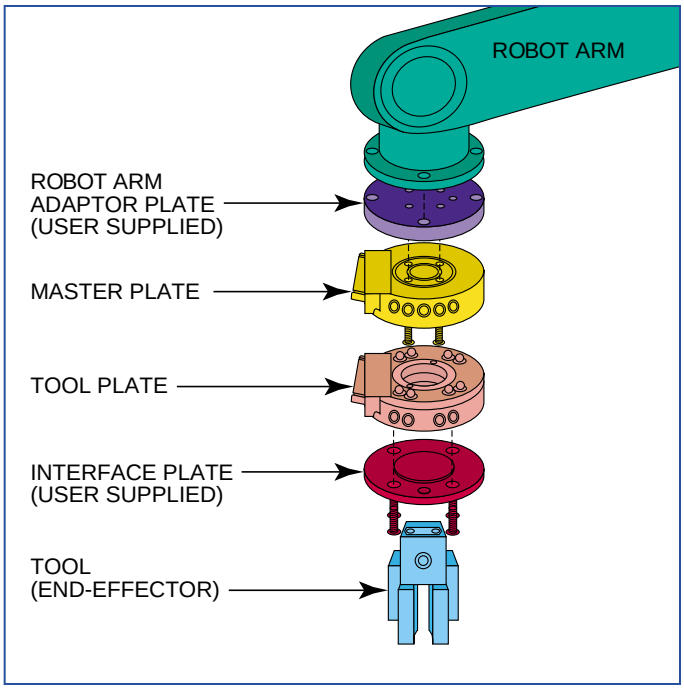
Option	# Pins	Electrical Rating	Description	Comments
MT8	8	20A/500V	MS cylindrical, threaded connector	Sealed, no-touch master pins
S19/S26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
R19/R26	19/26	5A/250V	MS miniature quick-disconnect connector	Fluid resistant, untouchable master pins
J16	16	5A/250V	MS miniature quick-disconnect connector	Serrated rhodium-plated contact pins
T19	19	5A/250V	MS cylindrical, threaded connector	Fluid resistant, untouchable master pins
F02/F04	—	—	(2) or (4) 3/8 G/NPT self-sealing ports	For fluid or pneumatic pass-through
P14	—	—	Additional (2) 1/4 NPT pneumatic ports	Provides a total of 12 pneumatic ports
P18	—	—	Additional (4) 1/8 NPT pneumatic ports	Provides a total of 14 pneumatic ports
P38	—	—	Additional (4) 3/8 NPT pneumatic ports	Provides a total of 14 pneumatic ports
V34	—	—	3/4 G vacuum port	Vacuum only
SIP	—	—	Lock/unlock sensing	See page 19



Mounting the Tool Changer

The Master Plate is attached to the robot flange using an interface plate (furnished by the user). Screws and O-ring are provided for the Master Plate (a cover plate is provided). A boss and dowel pin hole are provided on the Master Plate for high accuracy location.

The Tool Plate is attached to the tool (end-effector) using an interface plate (furnished by the user). Use screws that match the tapped holes in the Tool Plate. A boss and dowel pin hole are provided on the Tool Plate for high accuracy location.



How to Select a Robotic Tool Changer

Sizing–If your moment is low or moderate, select a Tool Changer model with a payload rating similar to the robot it will be mounted on. If your moment is high, or if you prefer to use a TC model better suited to the application, you can use a more exact method.

More Exact Method–Moment capacity is a critical factor in selecting the proper Tool Changer model. Use the following to approximate your worst-case moment.

a) Find the approximate center-of-gravity (CG) of your heaviest end-effector.

b) Calculate the distance (D) from the CG to the bottom of the Tool Plate.

c) Calculate the weight (W) of the heaviest end-effector.

d) Multiply (W) times (D) to get an approximate static moment (M) (or a moment based on one G of acceleration).

e) Select a Tool Changer with a moment capacity equal to or greater than (M).

Robots may produce moments two to three times higher than (M) due to their potentially high acceleration. The Tool Changer models with moment capacity of (M) are designed to handle dynamic moments that are three times higher than (M).

Pneumatic and Electrical–Determine the number and size of pneumatic ports and electrical contacts needed. Larger Tool Changer models have larger and more numerous pneumatic ports and electrical contacts.

Temperature and Chemicals–The Tool Changer uses nitrile bushings to pass air to the Tool Plate, and Buna-N o-rings to seal the pneumatic locking mechanism. Not only are these rubber materials able to survive most chemicals, they are able to withstand

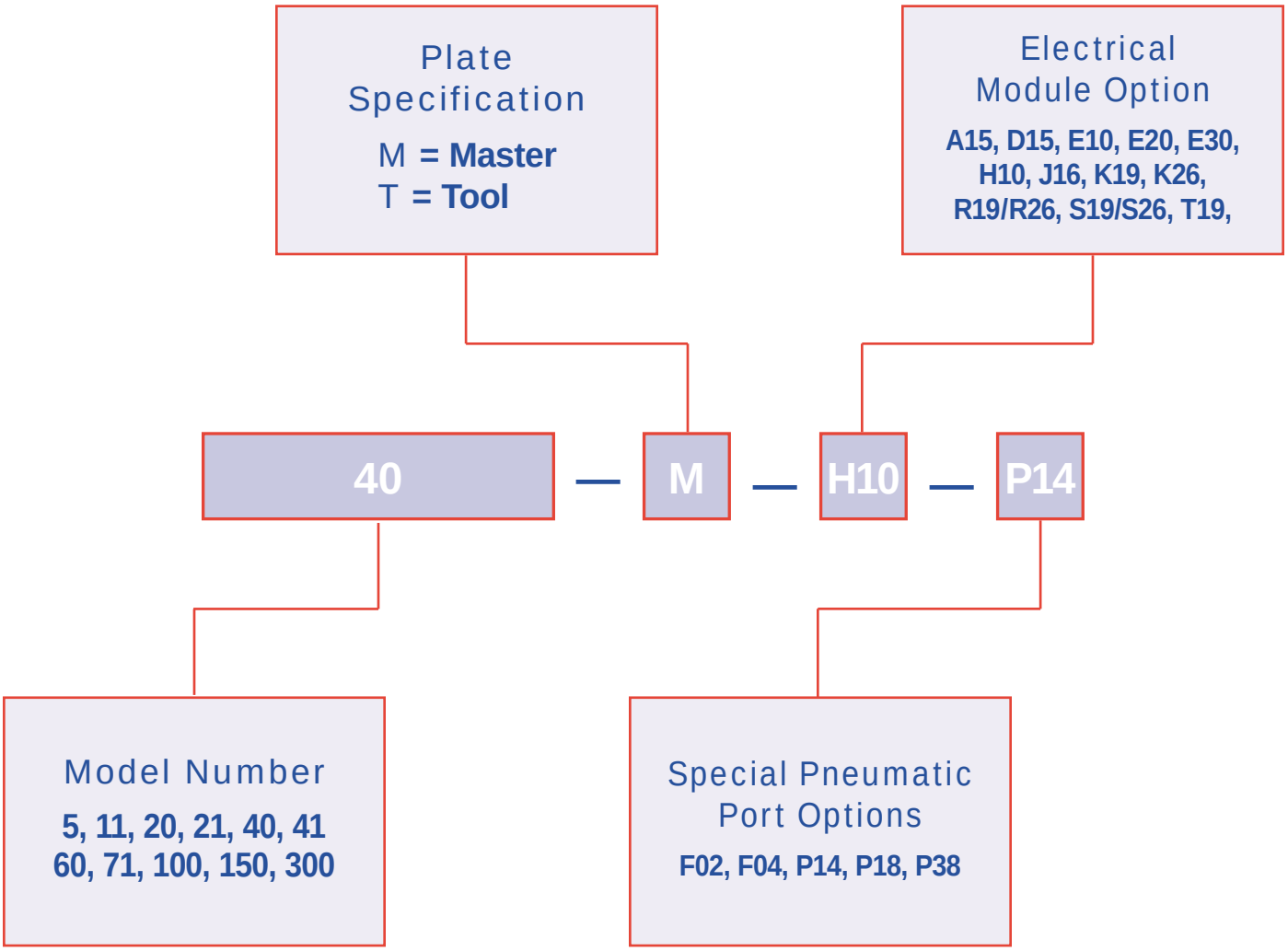
temperatures ranging from -20°F to 150°F. Please contact us for additional information if you have questions regarding temperatures or chemicals within your particular environment.

Precision Applications–Check the repeatability specifications when dealing with applications that require high repeatability.

REMEMBER

A tool changer affects your robot's moment capacity, payload, size, and repeatability. For a given payload, the Tool Changer is designed to exceed the robot's specifications.

Ordering Data



Sensor Interface Plate System

The Sensor Interface Plate (SIP) system has been designed to provide lock and unlock sensing inside the Robot Interface plate. The SIP consists of lock and unlock sensors, sensing peg, sensing plate and interface plate. Figures 1 through 4 show how the SIP works. The SIP Plate serves as the robot interface in Models TC-40 and higher. Please consult the Sales Department for TC-21 and lower interface plate.

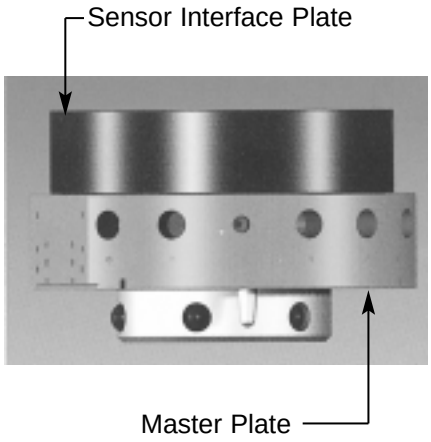


Figure 1

Side view of Master Plate with Sensor Interface Plate (SIP) system.

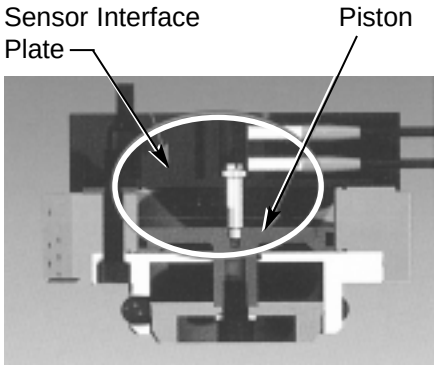


Figure 2

Section view of Figure 1 showing position of SIP system when locked without Tool Plate. Neither the lock nor unlock sensors are activated.

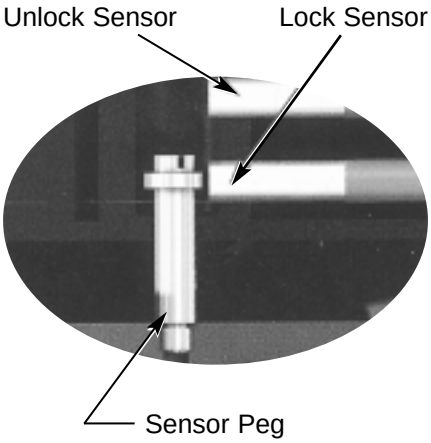


Figure 3

Close-up of SIP in lock position with the Tool Plate. Lock sensor activated by sensor peg.

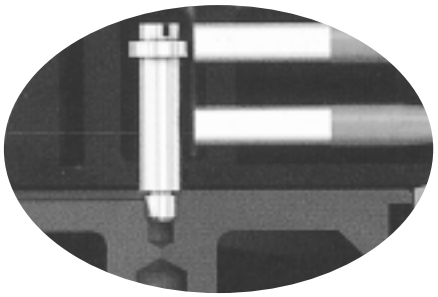


Figure 4

Close-up of SIP in unlock position. Unlock sensor activated by sensor peg. Lock sensor is not activated.

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