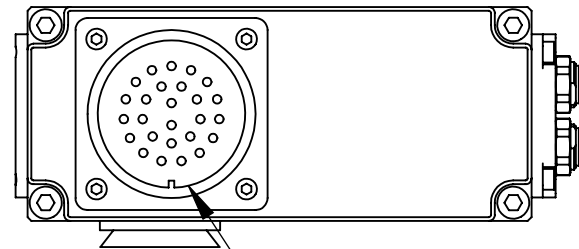


"DANGER!" - Electrical Shock Hazard

This module has a Voltage of 50V or greater, NO contact should be attempted before removing power. This especially includes separation or insertion of the mating connectors or any contact with the tool changer or its components.

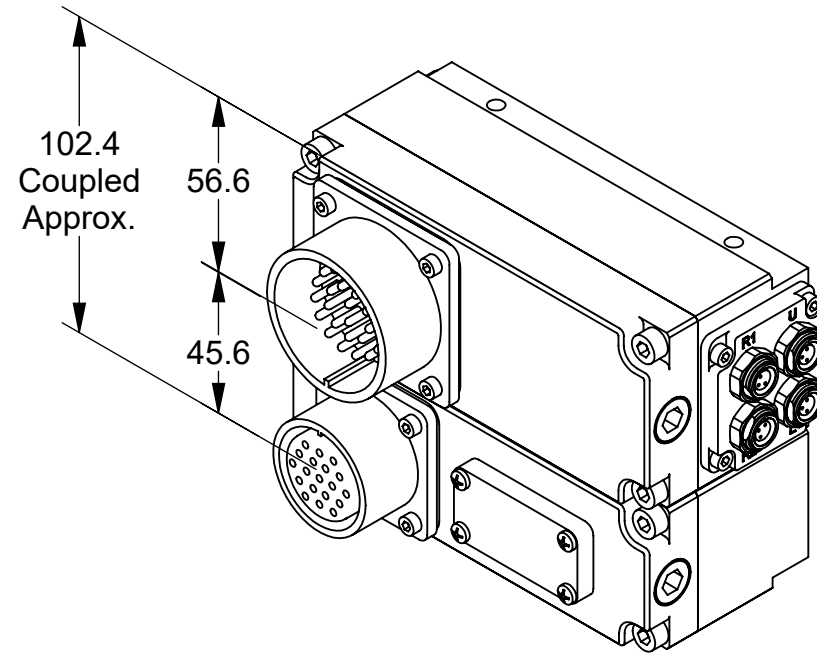
Rev.	Description	Initiator	Date
08	ECO 19187: Sheet 1: Removed "Sheet 6: SA2 Master with SA5 Tool (0-999 Tool ID)" note & renumbered. Removed Sheet 6 & renumbered.	TBC	7/27/2020

SA2 Master Module
(9121-SA2-M)

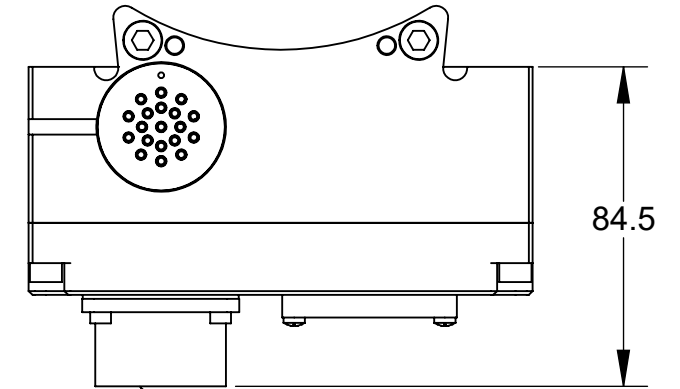


MS3102E28-12P
Male Connector

SA2 Family Dimensions

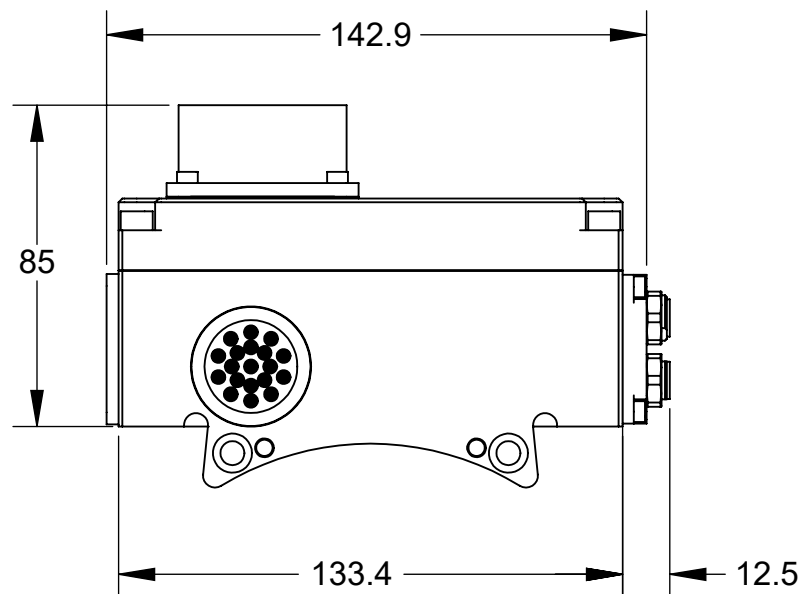
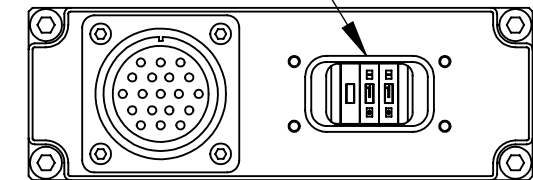


SA Tool Modules
(9121-SAx-T)



MS3102E22-14S
Female Connector

Tool ID Switches
Accessible Through Window
(If Applicable)
(Window Not Shown for Clarity)
(SA4-T Shown)



Sheet Configurations

- Sheet 1: SA2 Family Dimensions
- Sheet 2: SA2 Family Serviceable Parts
- Sheet 3: SA2 Master with SA2 Tool
- Sheet 4: SA2 Master with SA3 Tool (0-9 Tool ID)
- Sheet 5: SA2 Master with SA4 Tool (0-99 Tool ID)
- Sheet 6: SA2 Master with SA3Z1 Tool (0-F Tool ID)

NOTES: UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.



3rd ANGLE PROJECTION

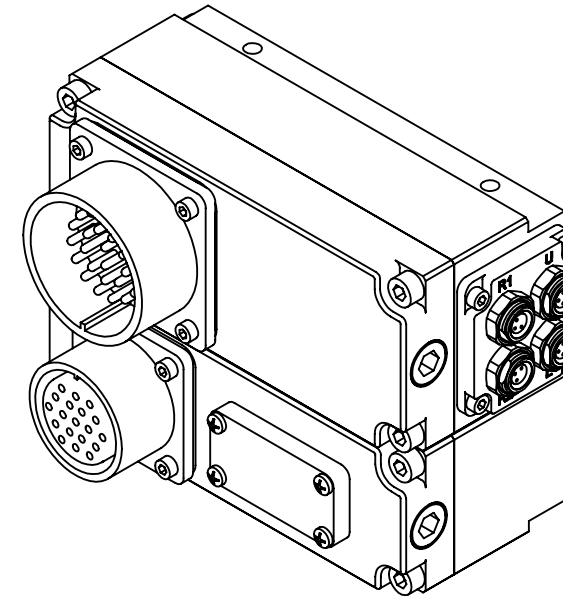
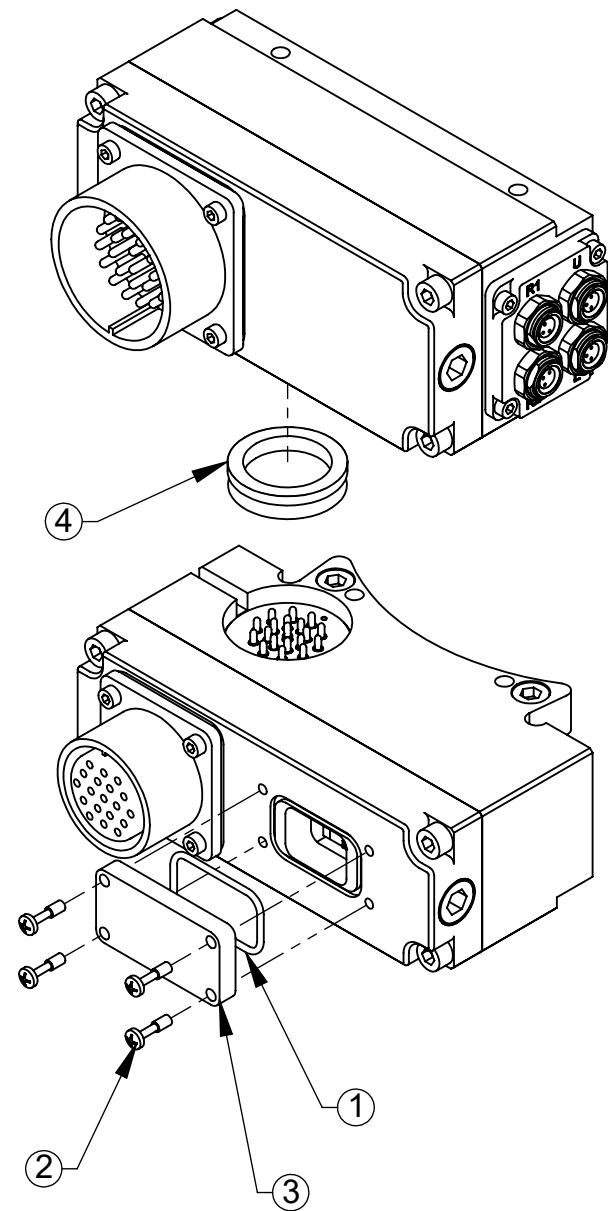


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DRAWN BY: B. Digeso, 3/31/05		TITLE	
CHECKED BY: R. Heavner, 4/1/05		SA2 Family Module Drawing	
PROJECT # 040611-1	SHEET 1 OF 6	SCALE	SIZE
		1:2	B
		DRAWING NUMBER	REVISION
		9630-20-SA2 Family	08

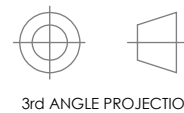
SA2 Family Serviceable Parts



ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	3410-0001092-01	O-ring AS568-023
2	4	3500-9957012-21	CAPTIVE SCREW M3 X 12 SLOTTED HEAD SS
3	1	3700-20-2696	Thick Window for DP/DE45 Master
4	1	4010-0000030-01	V-Ring Seal

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DRAWN BY: B. Digeso, 3/31/05

CHECKED BY: R. Heavner, 4/1/05

TITLE

SA2 Family Module Drawing

PROJECT # 040611-1 SHEET 2 OF 6

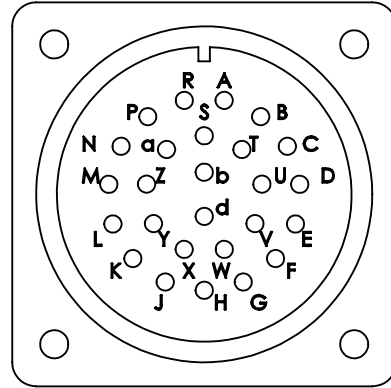
SCALE
1:2

SIZE
B

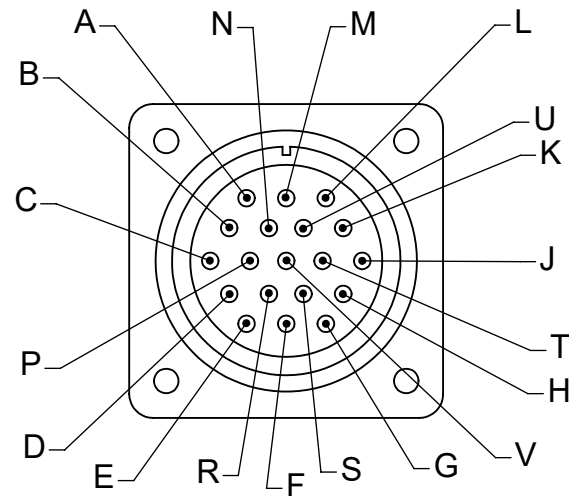
DRAWING NUMBER
9630-20-SA2 Family

REVISION
08

SA2 Master with SA2 Tool



Amphenol Connector
Master Side
MS3102E28-12P
Face View
Scale 1:1



Amphenol Connector
Tool Side
MS3102E22-14S
Face View
Scale 1:1

	SA2-M to SA2-T Pin Out		
SA2 Master MS3102E28-12P Male Connector		SA2 Tool MS3102E22-14S Female Connector	
0 Vdc Reference	A----- >> -----	A	0 Vdc Reference
24 Vdc (I/P)	B----- >> -----	B	24 Vdc (I/P)
available	C----- >> -----	C	available
available	D----- >> -----	D	available
available	E----- >> -----	E	available
available	F----- >> -----	F	available
available	G----- >> -----	G	available
available	H----- >> -----	H	available
available	J----- >> -----	J	available
available	K----- >> -----	K	available
available	L----- >> -----	L	available
available	M----- >> -----	M	available
available	N----- >> -----	N	available
available	P----- >> -----	P	available
available	R----- >> -----	R	available
available	S----- >> -----	S	available
available	T----- >> -----	T	available
available	U----- >> -----	U	available
available	V----- >> -----	V	available
not available	W		
not available	X		
not available	Y		
RTL #1	Z		
RTL #2	a		
Lock I/P	b		
Unlock I/P	d		

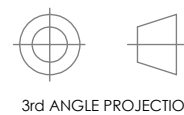
Controller Outputs		
Pin:	Signal:	Description:
A	0 VDC	Voltage Reference
B	24 VDC	Voltage Supply
Controller Inputs		
Pin:	Signal:	Description:
Z	RTL #1	Ready-To-Lock Input #1
a	RTL #2	Ready-To-Lock Input #2
b	Lock	Tool Changer Lock Input
d	Unlock	Tool Changer Unlock Input

General Notes:

- Pin A is first mate and last break during a tool change and is specified for use as 0 VDC and/or ground service.

NOTES: UNLESS OTHERWISE SPECIFIED.

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3rd ANGLE PROJECTION

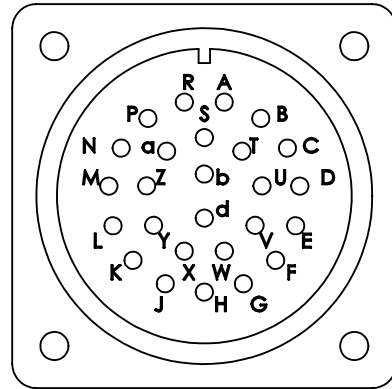


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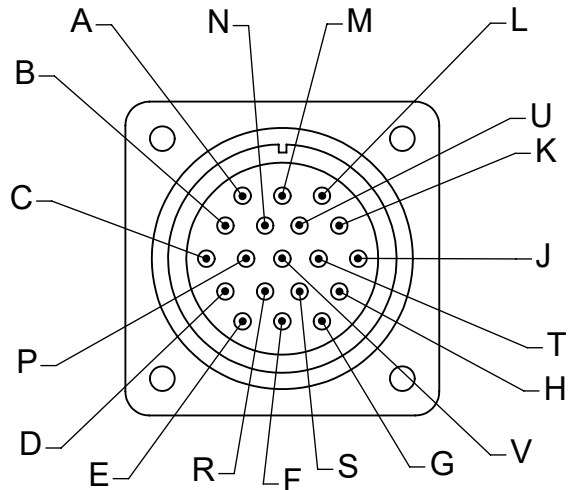
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DRAWN BY: B. Digeso, 3/31/05	TITLE SA2 Family Module Drawing		
CHECKED BY: R. Heavner, 4/1/05	SCALE	SIZE	DRAWING NUMBER
PROJECT # 040611-1 SHEET 3 OF 6	1:2	B	9630-20-SA2 Family
			REVISION 08

SA2 Master with SA3 Tool



Amphenol Connector
Master Side
MS3102E28-12P
Face View
Scale 1:1



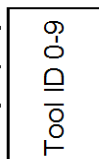
Amphenol Connector
Tool Side
MS3102E22-14S
Face View
Scale 1:1

SA2-M to SA3-T Pin Out

SA2 Master
MS3102E28-12P
Male Connector

SA3 Tool
MS3102E22-14S
Female Connector

0 Vdc Reference	A ----- >> -----	A	0 Vdc Reference
24 Vdc (I/P & Tool ID)	B ----- >> -----	B	24 Vdc (I/P & Tool ID)
available	C ----- >> -----	C	available
available	D ----- >> -----	D	available
available	E ----- >> -----	E	available
available	F ----- >> -----	F	available
available	G ----- >> -----	G	available
available	H ----- >> -----	H	available
available	J ----- >> -----	J	available
available	K ----- >> -----	K	available
available	L ----- >> -----	L	available
available	M ----- >> -----	M	available
available	N ----- >> -----	N	available
available	P ----- >> -----	P	available
available	R ----- >> -----	R	available
Tool ID, Bit Value 8	S ----- >> -----	S	not available
Tool ID, Bit Value 4	T ----- >> -----	T	not available
Tool ID, Bit Value 2	U ----- >> -----	U	not available
Tool ID, Bit Value 1	V ----- >> -----	V	not available
not available	W ----- >> -----	W	
not available	X ----- >> -----	X	
not available	Y ----- >> -----	Y	
RTL #1	Z ----- >> -----	Z	
RTL #2	a ----- >> -----	a	
Lock I/P	b ----- >> -----	b	
Unlock I/P	d ----- >> -----	d	



Controller Outputs		
Pin:	Signal:	Description:
A	0 VDC	Voltage Reference
B	24 VDC	Voltage Supply
Controller Inputs		
Pin:	Signal:	Description:
S	Tool ID	Bit Value 8 (See Table)
T	Tool ID	Bit Value 4 (See Table)
U	Tool ID	Bit Value 2 (See Table)
V	Tool ID	Bit Value 1 (See Table)
Z	RTL #1	Ready-To-Lock Input #1
a	RTL #2	Ready-To-Lock Input #2
b	Lock	Tool Changer Lock Input
d	Unlock	Tool Changer Unlock Input

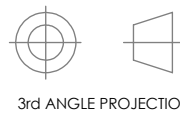
Switch 1	Pin "S"	Pin "T"	Pin "U"	Pin "V"
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

General Notes:

1. Pin A is first mate and last break during a tool change and is specified for use as 0 VDC and/or ground service.
2. The common for Tool ID is tied into the 24VDC line (Pin B). The Tool ID switches are Rated for service at 50V and 100 mA max. Refer to the Tool ID table for switch setup information.

NOTES: UNLESS OTHERWISE SPECIFIED.

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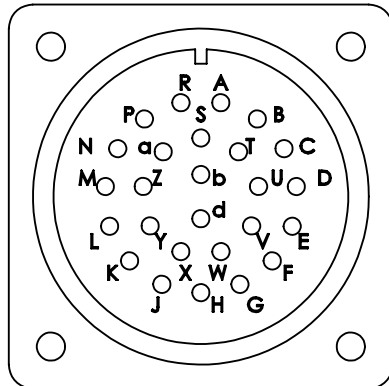


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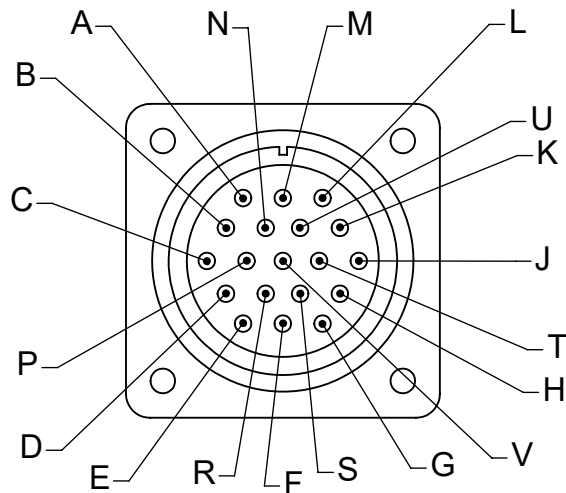
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DRAWN BY: B. Digeso, 3/31/05		TITLE	
CHECKED BY: R. Heavner, 4/1/05		SA2 Family Module Drawing	
PROJECT # 040611-1	SHEET 4 OF 6	SCALE 1:2	SIZE B
DRAWING NUMBER 9630-20-SA2 Family		REVISION 08	

SA2 Master with SA4 Tool



Amphenol Connector
Master Side
MS3102E28-12P
Face View
Scale 1:1



Amphenol Connector
Tool Side
MS3102E22-14S
Face View
Scale 1:1

SA2-M to SA4-T Pin Out

SA2 Master MS3102E28-12P Male Connector	SA2-M to SA4-T Pin Out	SA4 Tool MS3102E22-14S Female Connector
0 Vdc Reference	A ----->>-----	A
24 Vdc (I/P & Tool ID)	B ----->>-----	B
available	C ----->>-----	C
available	D ----->>-----	D
available	E ----->>-----	E
available	F ----->>-----	F
available	G ----->>-----	G
available	H ----->>-----	H
available	J ----->>-----	J
available	K ----->>-----	K
available	L ----->>-----	L
SW2 Tool ID, Bit Value 8	M ----->>-----	M
SW2 Tool ID, Bit Value 4	N ----->>-----	N
SW2 Tool ID, Bit Value 2	P ----->>-----	P
SW2 Tool ID, Bit Value 1	R ----->>-----	R
SW1 Tool ID, Bit Value 8	S ----->>-----	S
SW1 Tool ID, Bit Value 4	T ----->>-----	T
SW1 Tool ID, Bit Value 2	U ----->>-----	U
SW1 Tool ID, Bit Value 1	V ----->>-----	V
not available	W	
not available	X	
not available	Y	
RTL #1	Z	
RTL #2	a	
Lock I/P	b	
Unlock I/P	d	

Controller Outputs		
Pin:	Signal:	Description:
A	0 VDC	Voltage Reference
B	24 VDC	Voltage Supply
Controller Inputs		
Pin:	Signal:	Description:
M	Tool ID	SW2 Bit Value 8 (See Table)
N	Tool ID	SW2 Bit Value 4 (See Table)
P	Tool ID	SW2 Bit Value 2 (See Table)
R	Tool ID	SW2 Bit Value 1 (See Table)
S	Tool ID	SW1 Bit Value 8 (See Table)
T	Tool ID	SW1 Bit Value 4 (See Table)
U	Tool ID	SW1 Bit Value 2 (See Table)
V	Tool ID	SW1 Bit Value 1 (See Table)
Z	RTL #1	Ready-To-Lock Input #1
a	RTL #2	Ready-To-Lock Input #2
b	Lock	Tool Changer Lock Input
d	Unlock	Tool Changer Unlock Input

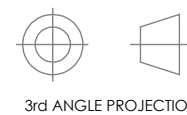
Switch 1	Pin	Pin	Pin	Pin
	"S"	"T"	"U"	"V"
	"M"	"N"	"P"	"R"
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

General Notes:

1. Pin A is first mate and last break during a tool change and is specified for use as 0 VDC and/or ground service.
2. The common for Tool ID is tied into the 24VDC line (Pin B). The Tool ID switches are Rated for service at 50V and 100 mA max. Refer to the Tool ID table for switch setup information.

NOTES: UNLESS OTHERWISE SPECIFIED.

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3rd ANGLE PROJECTION

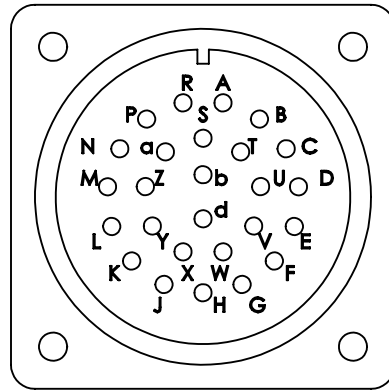


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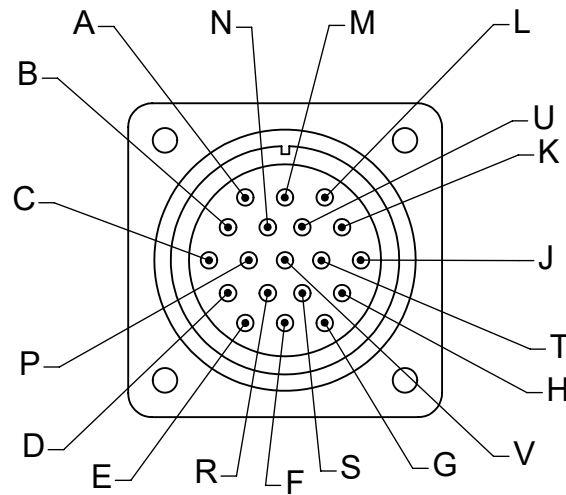
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DRAWN BY: B. Digeso, 3/31/05	TITLE		
CHECKED BY: R. Heavner, 4/1/05	SA2 Family Module Drawing		
PROJECT # 040611-1	SCALE	SIZE	DRAWING NUMBER
SHEET 5 OF 6	1:2	B	9630-20-SA2 Family
			REVISION
			08

SA2 Master with SA3Z1 Tool



Amphenol Connector
Master Side
MS3102E28-12P
Face View
Scale 1:1



Amphenol Connector
Tool Side
MS3102E22-14S
Face View
Scale 1:1

SA2-M to SA3Z1-T Pin Out

SA2 Master
MS3102E28-12P
Male Connector

SA3Z1 Tool
MS3102E22-14S
Female Connector

0 Vdc Reference	A ----- >> ----- A	0 Vdc Reference
24 Vdc (I/P & Tool ID)	B ----- >> ----- B	24 Vdc (I/P & Tool ID)
available	C ----- >> ----- C	available
available	D ----- >> ----- D	available
available	E ----- >> ----- E	available
available	F ----- >> ----- F	available
available	G ----- >> ----- G	available
available	H ----- >> ----- H	available
available	J ----- >> ----- J	available
available	K ----- >> ----- K	available
available	L ----- >> ----- L	available
available	M ----- >> ----- M	available
available	N ----- >> ----- N	available
available	P ----- >> ----- P	available
available	R ----- >> ----- R	available
Tool ID, Bit Value 8	S ----- >> ----- S	not available
Tool ID, Bit Value 4	T ----- >> ----- T	not available
Tool ID, Bit Value 2	U ----- >> ----- U	not available
Tool ID, Bit Value 1	V ----- >> ----- V	not available
not available	W	
not available	X	
not available	Y	
RTL #1	Z	
RTL #2	a	
Lock I/P	b	
Unlock I/P	d	

Controller Outputs		
Pin:	Signal:	Description:
A	0 VDC	Voltage Reference
B	24 VDC	Voltage Supply

Controller Inputs		
Pin:	Signal:	Description:
S	Tool ID	Bit Value 8 (See Table)
T	Tool ID	Bit Value 4 (See Table)
U	Tool ID	Bit Value 2 (See Table)
V	Tool ID	Bit Value 1 (See Table)
Z	RTL #1	Ready-To-Lock Input #1
a	RTL #2	Ready-To-Lock Input #2
b	Lock	Tool Changer Lock Input
d	Unlock	Tool Changer Unlock Input

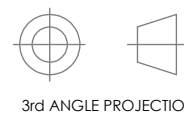
Switch 1	Pin "S"	Pin "T"	Pin "U"	Pin "V"
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
A	1	0	1	0
B	1	0	1	1
C	1	1	0	0
D	1	1	0	1
E	1	1	1	0
F	1	1	1	1

General Notes:

- Pin A is first mate and last break during a tool change and is specified for use as 0 VDC and/or ground service.
- The common for Tool ID is tied into the 24VDC line (Pin B). The Tool ID switches are Rated for service at 30V and 30 mA max. Refer to the Tool ID table for switch setup information.

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3rd ANGLE PROJECTION



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DRAWN BY: B. Digeso, 3/31/05		TITLE	
CHECKED BY: R. Heavner, 4/1/05		SA2 Family Module Drawing	
PROJECT # 040611-1	SHEET 6 OF 6	SCALE 1:2	SIZE B
DRAWING NUMBER 9630-20-SA2 Family		REVISION 08	