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Service Bulletin M0840-G-E1
EPS Dimensions/Codes HV2, AV, AVN, JV, MHP Cylinders
 Issued: October, 2003
 Supersedes: None

This bulletin contains mounting information for EPS & CLS Style Proximity Switches by bore and rod combination. For cylinder dimensions not shown, consult the current catalog.

Switches, spacers and mounting bolts have each been assigned a code that can be found in Tables 2, 3 and 4.

The components of a complete switch assembly may be identified by cross referencing these codes with the part numbers in Tables 5, 6 and 7.

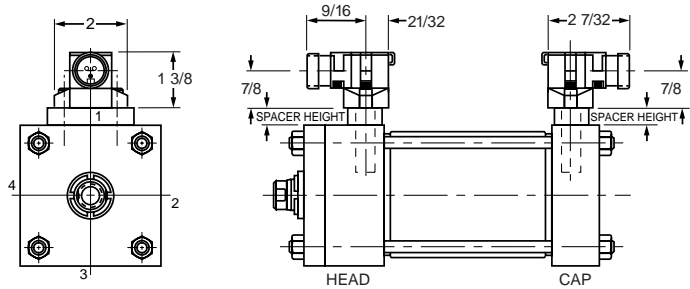
Warning

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

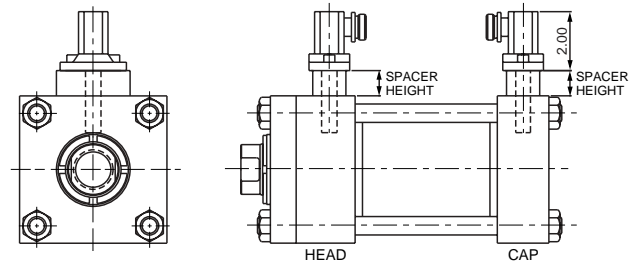
This document and other information from the Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The product described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by the Company and its subsidiaries at any time without notice.

EPS-5 Automotive Applications



**CLS-1 & 4 Switches
 Extreme Temperature Applications**



EPS-6 & 7 Heavy Duty Industrial Applications

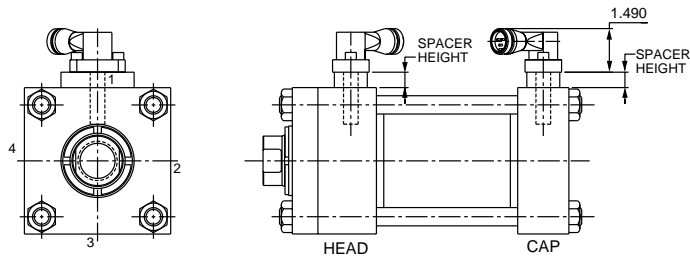


Table 1 - Available Mounting Positions for EPS- 5, 6, 7 & CLS 1, 4

EPS 5,6,7 & CLS 1, 4		Switch Locations for Series AV, AVN, JV, HV2, MHP									
MOUNTING STYLES											
Bores sizes (inches):		1.5	2	2.5	3.25	4	5	6	7	8	10
MHP bores sizes (mm):		40	50	63	80	100	125	160	-	200	-
50, 51, 52, 53, 84, 86, 89	HEAD	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
	CAP	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
61, 67, 81 (see note 3)	HEAD	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
	CAP	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
62, 68, 82	HEAD	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
	CAP	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
72 (see note 2)	HEAD	1	1	1	1	1	1	1,2,4	1,2,4	1,2,4	1,2,4
	CAP	1	1	1	1	1	1	1,2,4	1,2,4	1,2,4	1,2,4
73	HEAD	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
	CAP	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
71, 74, 77	HEAD	1	1	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4
	CAP	1	1	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4	1,2,4
65	HEAD	NA	NA	NA	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
	CAP	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
66	HEAD	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
	CAP	NA	NA	NA	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4

Note: The electrical connector orientation may be restricted in some cases. Consult the dimensions in the current catalog.

Note 2: On 6" cylinders and larger, and for 160mm and 200mm bores, switches mounted in position 2 or 4 will interfere with the installation and removal of mounting bolts.

Note 3: On 1.5 through 5" Model 67 cylinders, switches will extend beyond mounting surface of cylinder.

Note 4: Positions 1, 2, 3 and 4 are determined by viewing cylinder from piston rod end and going clockwise.

**EPS Dimensions/Codes
HV2, AV, AVN, JV, MHP Cylinders**

Series AV, AVN, JV

Table 2 CODES FOR AV, AVN, & JV SERIES CYLINDERS WITH EPS 5, 6, 7 & CLS 1, 4 SWITCHES										
BORE	SERIES	ROD DIA	END-OF-STROKE PROBE LOCATION ("GG" ORDER CODE)	SPACER HEIGHT	SWITCH CODE	SPACER CODE	EPS 5 BOLT CODE (1)	EPS 6,7 BOLT CODE (1)	CLS 1, 4 BOLT CODE (1)	OPTIONAL STROKE TO GO ("FF" ORDER CODE)
1.5	AV/JV	0.63	0.59	0.688	1	FK	F99	299	F99	0.44
		1	0.59	0.876	1	1K	199	399	199	0.44
		CAP	0.63	0.468	1	BK	GD9	1D9	9D9	0.17
2	AV/JV	0.63	0.59	0.579	1	D2	0E9	2E9	0E9	0.44
		1.375	0.59	0.829	1	H2	199	399	199	0.44
		1	0.59	0.688	1	F2	F99	299	F99	0.44
		CAP	0.63	1.048	2	EG2	299	499	299	0.17
2.5	AV/JV	0.63	0.63	0.296	1	E	F9	29	F9	0.48
		1.75	0.63	0.796	1	EH	29	49	29	0.48
		1	0.63	0.421	1	G	19	39	19	0.48
		1.38	0.63	0.608	1	DF	29	39	29	0.48
		CAP	0.63	0.780	2	FG	29	49	29	0.17
3.25	AV/JV	1	0.88	0.858	2	FH	39	49	39	0.73
		2	0.56	0.608	1	DF	29	39	29	0.42
		1.375	0.88	0.249	1	D	FE	2E	FE	0.73
		1.75	0.88	0.421	1	G	19	39	19	0.73
		CAP	0.75	0.546	2	J	29	39	29	0.34
4	AV/JV	1	0.88	0.499	2	H	19	39	19	0.73
		2.5	0.56	0.546	1	J	29	39	29	0.42
		1.375	0.88	0.671	2	DG	29	49	29	0.73
		1.75	0.88	0.858	2	FH	39	49	39	0.73
		2	0.56	0.249	0	D	FE	2E	FE	0.42
5	AV/JV	CAP	0.75	0.170	2	C	0D	1D	0D	0.34
		1	0.88	0.796	3	EH	39	49	39	0.72
		3.5	0.56	0.546	1	J	29	39	29	0.42
		1.38	0.88	0.170	2	C	FD	2D	FD	0.72
		1.75	0.88	0.358	2	F	F9	29	F9	0.72
		2	0.56	0.546	2	J	29	39	29	0.42
		2.5	0.56	0.858	2	FH	39	49	39	0.42
6	AV/JV	3	0.56	0.296	1	E	F9	29	F9	0.42
		CAP	0.75	0.499	3	H	19	39	19	0.34
		1.38	1.13	0.499	3	H	29	39	29	0.98
		4	0.81	0.296	1	E	F9	29	F9	0.66
		1.75	1.13	0.671	3	DG	29	49	29	0.98
		2	0.81	0.858	3	FH	39	49	39	0.66
		2.5	0.81	0.358	2	F	F9	29	F9	0.66
7	AV	3	0.81	0.608	2	DF	29	39	29	0.66
		3.5	0.81	0.858	2	FH	39	49	39	0.66
		CAP	0.75	0.109	3	A	GD	1D	GD	0.34
		1.38	1.13	0	3	NONE	G	1	G	0.98
8	AV/JV	1.75	1.13	0.170	3	C	FD	2D	FD	0.98
		2	0.81	0.358	3	F	F9	29	F9	0.66
		CAP	0.94	1.296	4	EHH	5B	6B	5B	0.53
		1.38	1.13	1.171	4	DGH	4B	6B	4B	0.98
		5.5	0.69	0.921	2	GH	3B	5B	3B	0.54
		1.75	1.13	1.358	4	FHH	5B	6B	5B	0.98
		2	0.81	1.546	4	HHJ	6C	7C	6C	0.66
		2.5	0.81	0.170	3	C	FD	2D	FD	0.66
		3	0.81	0.421	3	G	19	39	19	0.66
10	AV	3.5	0.81	0.671	3	DG	29	49	29	0.66
		4	0.81	0.110	2	A	GD	1D	GD	0.66
		5	0.81	0.671	2	DG	29	49	29	0.66
		CAP	0.94	0.796	4	EH	39	49	39	0.63
		1.75	1.38	0.296	4	E	F9	29	F9	1.22
		2	1.06	0.499	4	H	19	39	19	0.91
		2.5	1.06	0.499	4	EH	39	49	39	0.91
		3	1.06	1.046	4	DEH	4B	5B	4B	0.91
10	AV	3.5	1.06	1.296	4	EHH	5B	6B	5B	0.91
		4	1.06	0	3	NONE	G	1	G	0.91
		5	0.94	0.421	3	G	19	39	19	0.79
		5.5	0.94	0.671	3	DG	29	49	29	0.79
		CAP	0.94	0	4	NONE	G	1	G	0.53

(1) The first digit of the Bolt Code refers to screws that mount the switch to the cylinder. The second and third digits refer to screws that mount the spacers to the cylinder.

**EPS Dimensions/Codes
HV2, AV, AVN, JV & MHP Cylinders**

**Series MHP
Switch Part Numbers**

Table 4 CODES FOR MHP SERIES CYLINDERS WITH EPS 5, 6, 7 & CLS 1, 4 SWITCHES										
BORE	SERIES	ROD DIA	END-OF-STROKE PROBE LOCATION ("GG" ORDER CODE)	SPACER HEIGHT	SWITCH CODE	SPACER CODE	EPS 5 BOLT CODE (1)	EPS 6, 7 BOLT CODE (1)	CLS 1, 4 BOLT CODE (1)	OPTIONAL STROKE TO GO ("FF" ORDER CODE)
40	MHP	18	0.875	0.688	1	F3	HPP	HPP	LPP	.532
		28	0.875	0.688	1	F3	HPP	HPP	LPP	.532
		CAP	0.875	1.048	2	EG3	KPPZ	KPP	UPP	.656
50	MHP	22	0.875	1.188	2	FH3	KPP	KPP	UPP	.532
		36	0.875	0.626	1	E3	HPP	HPP	LPP	.532
		28	0.875	0.500	1	C3	HPP	HNP	WPP	.532
		CAP	0.875	0.829	2	H3	JPP	JPP	HPP	.656
63	MHP	28	0.875	0.249	1	D	HN	HN	LN	.500
		45	0.875	0.546	1	J	JS	JP	UP	.500
		36	0.875	0.358	1	F	JR	HP	HP	.500
		CAP	0.875	0.671	2	DG	KT	KP	UP	.656
80	MHP	36	1.125	0.671	2	DG	KT	KP	UP	.500
		56	0.812	0.296	1	E	HN	HN	LN	.500
		45	1.125	0.858	2	FH	KJ	KP	UP	.500
		CAP	1.000	0.296	2	E	HR	HP	LP	.656
100	MHP	45	1.125	0.608	2	DF	JT	JP	UP	.500
		70	0.812	0.358	1	F	HR	HP	LP	.500
		56	0.812	0.858	2	FH	KU	KP	JP	.500
		CAP	1.000	0.170	2	C	HV	HN	LN	.656
125	MHP	56	0.812	0.170	2	C	HV	HN	LN	.500
		90	0.812	0.109	1	A	LV	LN	WN	.500
		70	0.812	0.499	2	H	JS	JP	HP	.500
		CAP	1.000	0.421	3	G	JS	JP	HP	.656
160	MHP	70	1.062	0.499	3	H	JS	JP	HP	.500
		110	1.062	0.499	2	H	JS	JP	HP	.500
		90	1.062	0.109	2	A	LV	LN	WN	.500
		CAP	1.312	0.546	4	J	XW	MQ	YQ	.670
200	MHP	90	1.562	0.170	3	C	HV	HN	LN	.670
		140	1.687	0.421	2	G	JS	JP	HP	.670
		110	1.687	0.546	3	J	JS	JP	UP	.670
		CAP	1.937	0.671	4	DG	KT	KP	UP	.670

(1) The first digit of the Bolt Code refers to screws that mount the switch to the cylinder. The second and third digits refer to screws that mount the spacers to the cylinder.

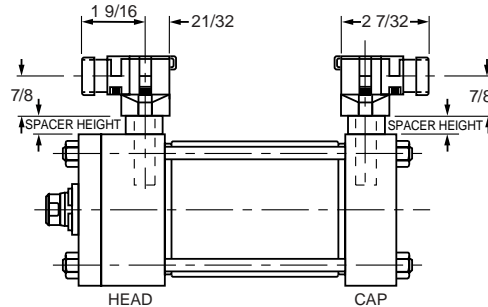
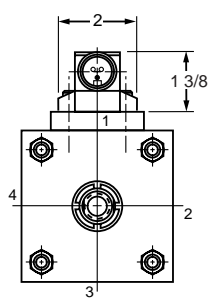
Table 5-EPS & CLS Switches						
Code	Probe Length (inches)	Miller Part Number				
		EPS 5 AC	EPS 6 DC	EPS 7 AC	CLS 1 AC	CLS 4 AC
1	1.250	1466170125	1488960125	1488970125	1482750125	1491090125
2	2.062	1466170206	1488960206	1488970206	1482750206	1491090206
3	2.875	1466170287	1488960287	1488970287	1482750287	1491090287
4	4.562	1466170456	1488960456	1488970456	1482750456	1491090456
Brand		Namco	Pepperl & Fuchs	Pepperl & Fuchs	Topworx	Topworx
Connection		3 Pin Mini	5 Pin Mini	3 Pin Mini	3 Pin Mini	144" PTFE Coated Flying Leads with 1/2" conduit hub
Voltage		50-220 VAC/DC	10-30 VDC	50-220 VAC/DC	24-240 VAC/DC	24 to 240 VAC/DC
Output		Normally Open	PNP & NPN	Normally Open	SPDT, Form C	SPDT, Form C
Leakage Current		<1.7mA	NA	<1.7mA	-	-
Voltage Drop		<10 Volts	<.8 VDC	<10 Volts	NA	NA

Table 6 — Spacer Blocks					
Letter Code	Part #	Spacer Height (inches)	Letter Code	Part #	Spacer Height (inches)
A	0854690110	.109	EH	0854690797	.796
B	0854670000	.138	FH	0854690859	.858
C	0854690171	.170	GH	0854690922	.921
D	0854690250	.249	BGG	0854690983	.982
E	0854690297	.296	DEH	0854691047	1.046
F	0854680359	.358	DGH	0854691172	1.171
G	0854690422	.421	EHH	0854691297	1.296
H	0854690500	.499	FHH	0854691359	1.358
J	0854690547	.546	GHH	0854691422	1.421
K	0854660000	.330	HHJ	0854691547	1.546
DF	0854690609	.608	DHHH	0854691750	1.749
DG	0854690672	.671	1	0854680547	.546
EG	0854690719	.718	2	0854820000	.330
FG	0854690781	.780	3*	0875830000	.330

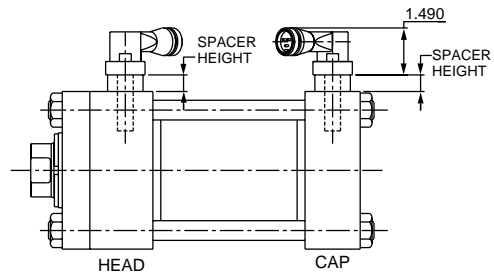
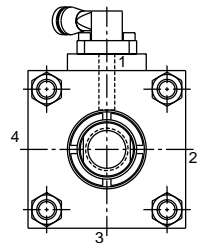
One O-Ring per spacer, Size# 2 - 15, Part Number 0100240003 (Fluorocarbon)

* Used on MHP only

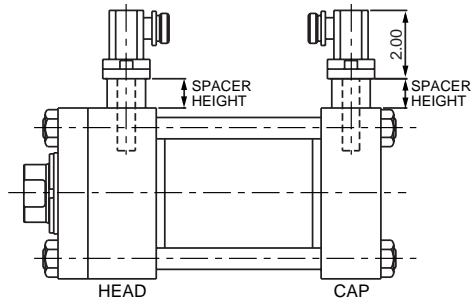
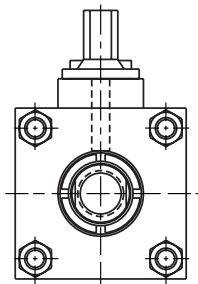
EPS-5 Automotive Applications



EPS-6 & 7 Heavy Duty Industrial Applications



CLS-1 & 4 Extreme Temperature Applications



**EPS & CLS Dimensions/Codes
HV2, AV, AVN, JV, & MHP Cylinders**

Series HV2

Table 3 CODES FOR HV2 SERIES CYLINDERS WITH EPS 5, 6, 7 & CLS 1, 4 SWITCHES										
BORE	SERIES	ROD DIA	END-OF-STROKE PROBE LOCATION ("GG" ORDER CODE)	SPACER HEIGHT	SWITCH CODE	SPACER CODE	EPS 5 BOLT CODE (1)	EPS 6, 7 BOLT CODE (1)	CLS 1, 4 BOLT CODE (1)	OPTIONAL STROKE TO GO ("FF" ORDER CODE)
1.5	HV2	0.63	0.880	0.439	1	A2	GD9	1D9	GD9	.422
		1	0.880	0.626	1	E2	F99	299	F99	.422
		CAP	0.937	1.048	2	EG2	299	499	299	.381
2	HV2	1	0.880	0.439	1	A2	GD9	1D9	GD9	.442
		1.375	0.880	0.579	1	D2	0E9	2E9	0E9	.442
		CAP	0.875	0.938	2	DF2	299	399	299	.319
2.5	HV2	1	0.880	0.170	1	C	FD	2D	FD	.475
		1.75	0.880	0.546	1	J	29	39	29	.475
		1.375	0.880	0.358	1	F	F9	39	F9	.475
		CAP	0.875	0.671	2	DG	29	49	29	.319
3.25	HV2	1.375	1.125	0.671	2	DG	29	49	29	.725
		2	0.812	0.249	1	D	FE	2	FE	.417
		1.75	1.125	0.858	2	FH	39	49	39	.725
		CAP	1.062	0.296	2	E	F9	29	F9	.506
4	HV2	1.75	1.125	0.608	2	DF	29	39	29	.725
		2.5	0.812	0.296	1	E	F9	29	F9	.417
		2	0.812	0	1	NONE	G	1	G	.417
		CAP	1.000	0.170	2	C	FD	2D	FD	.444
5	HV2	2	0.812	0.858	3	FH	39	49	39	.417
		3.5	0.812	0.858	2	FH	39	49	39	.417
		2.5	0.812	0.358	2	F	F9	29	F9	.417
		3	0.812	0.608	2	DF	29	39	29	.417
		CAP	0.875	0.358	3	F	F9	29	F9	.319
6	HV2	2.5	1.062	0.671	3	DG	29	49	29	.663
		4	1.062	0.608	2	DF	29	39	29	.663
		3	1.062	0.109	2	A	GD	1	GD	.663
		3.5	0.812	0.358	2	F	F9	29	F9	.417
		CAP	1.250	1.749	4	DHHH	6C	8D	6C	.683
7	HV2	3	1.562	0.421	3	G	19	39	19	1.162
		5	1.437	0.671	2	DG	29	49	29	1.037
		3.5	1.562	0.671	3	DG	29	49	29	1.162
		4	1.062	0.109	2	A	GD	1D	GD	.663
		CAP	1.687	1.421	4	GHH	51	7B	51	1.117
8	HV2	3.5	1.812	0.170	3	C	FD	2D	FD	1.412
		5.5	1.687	0.421	2	G	19	39	19	1.287
		4	1.062	0.421	3	G	19	39	19	.663
		5	1.437	0.170	2	C	FD	2D	FD	1.037
		CAP	1.687	0.921	4	GH	3B	5B	3B	1.183

(1) The first digit of the Bolt Code refers to screws that mount the switch to the cylinder. The second and third digits refer to screws that mount the spacers to the cylinder.

Table 7 — Mounting Bolts

Two mounting bolts are required per switch.

Mounting Bolts for AV, AVN, JV, HV2

Code #	Bolt Part Number	Bolt Length Inches	Bolt Thread & Type
0	0106340048	0.75	1/4-20 SHCS
1	0106340100	1.00	1/4-20 SHCS
2	0106340116	1.25	1/4-20 SHCS
3	0106340132	1.50	1/4-20 SHCS
4	0106340148	1.75	1/4-20 SHCS
5	0106340200	2.00	1/4-20 SHCS
6	0106340216	2.25	1/4-20 SHCS
7	0106340232	2.50	1/4-20 SHCS
8	0106340248	2.75	1/4-20 SHCS
9	0106280024	0.38	#8-32 SHCS
A	0106280032	0.50	#8-32 SHCS
B	0106280100	1.00	#8-32 SHCS
C	0106280132	1.50	#8-32 SHCS
D	0104530024	0.38	#8-32 PHS
E	0104530032	0.50	#8-32 PHS
F	0106340056	0.88	1/4-20 SHCS
G	0106340040	0.62	1/4-20 SHCS

Mounting Bolts for MHP

Code #	Bolt Part Number	Bolt Length mm	Bolt Thread & Type
H	1474210030	30	M6X1.0 SHCS
J	1474210040	40	M6X1.0 SHCS
K	1474210045	45	M6X1.0 SHCS
L	1474210025	25	M6X1.0 SHCS
M	1474210065	65	M6X1.0 SHCS
N	1487220210	10	M6X1.0 SHCS
P	1487640010	10	M6X1.0 SHCS (LOW HEAD)
Q	1474190035	35	M4X0.7 SHCS
R	1487220212	12	M4X0.7 FHSS
S	1487220216	16	M4X0.7 FHSS
T	1487220220	20	M4X0.7 FHSS
U	1474210035	35	M6X1.0 SHCS
V	1487220208	8	M4X0.7 FHSS
W	1474210020	20	M6X1.0 SHCS
X	1474210055	55	M6X1.0 SHCS
Y	1474210060	60	M6X1.0 SHCS
Z	0108800016	1/4" HI COLLAR LOCK WASHER, 4 REQ'D	

FHSS=Flat Head Socket Screw PHS=Phillip Head Screw