

Low Speed High Torque Hydraulic Motors



XCEL CS Series – European Preferred Products



Powering Business Worldwide

XCEL Spool Valve Motors

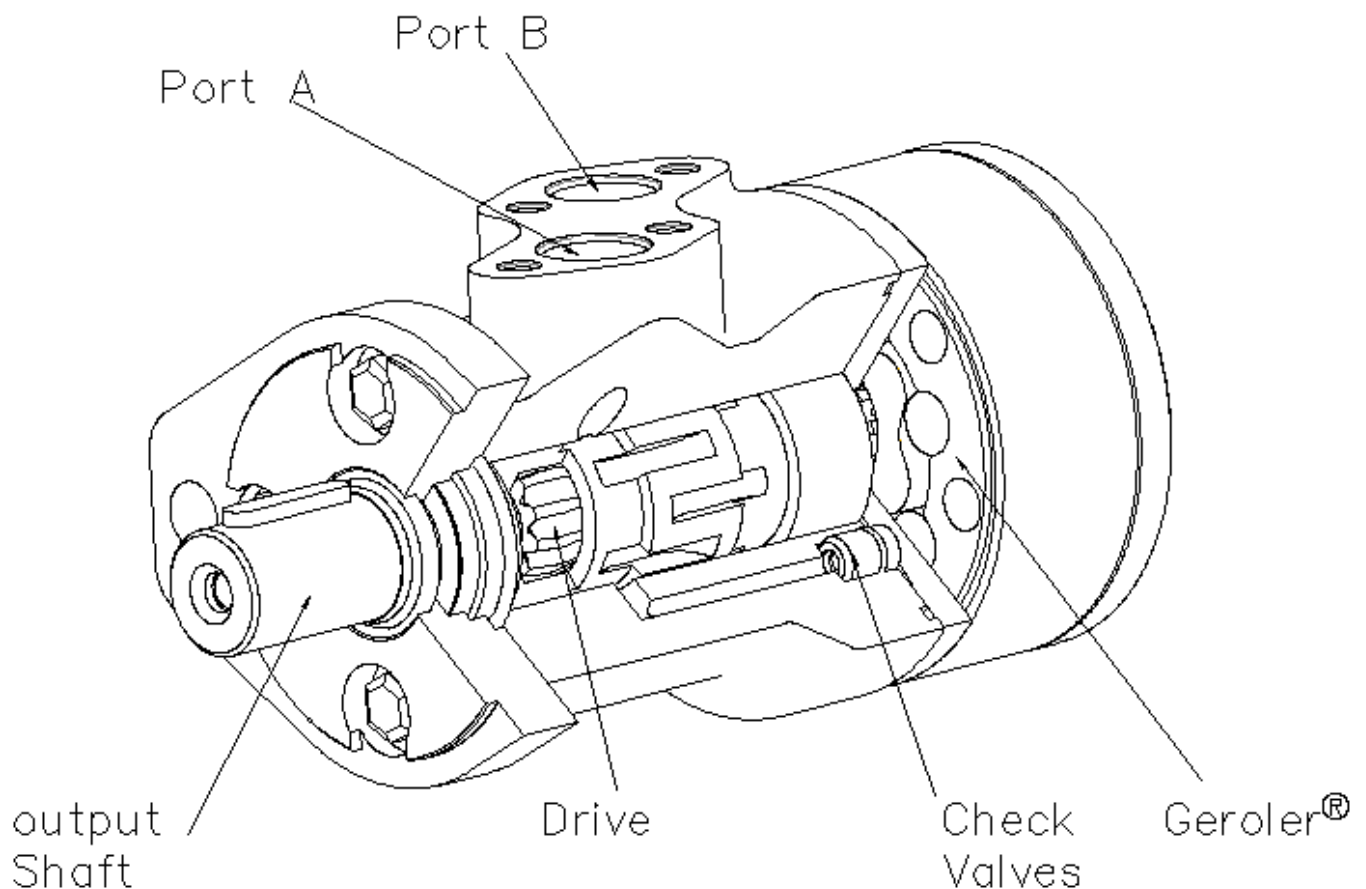
Product Description

XCEL Spool valve motors distribute pressurized fluid into and out of the Orbit gear set via valve slots integrated into the output shaft. The spool valve motors incorporate both valving and hydrodynamic journal bearings into a common shaft design.

These motors incorporate the proven orbit motor principle to provide high torque at low speeds. CS motors feature Eaton's Geroler technology for efficient operation and check valves to limit case pressure.

Motor shaft rotation can be instantly reversed by changing direction of Input/output flow while generating equal torque in either direction.

The displacements available provide a wide variety of speeds and torque.



XCEL Spool Valve Motors

Features Benefits and Applications

Features

- Proven orbit motor principle
- Hydrodynamic journal bearings
- Optimized drive running angle
- Internal check valves
- Constant clearance geroler design
- Variety of displacements and shafts

Benefits

- Compact ,powerful Package
- High efficiency
- Design flexibility
- Economically tailored solutions
- Extended motor life

Applications:

- Agricultural augers, harvesters, seeders
- Car wash brushes
- Food processing
- Railway maintenance equipment
- Machine tools
- Industrial sweepers and floor polishers
- Saw mill works
- Turf equipment
- Concrete and asphalt equipment
- Skid steer attachments
- Many more

Specifications

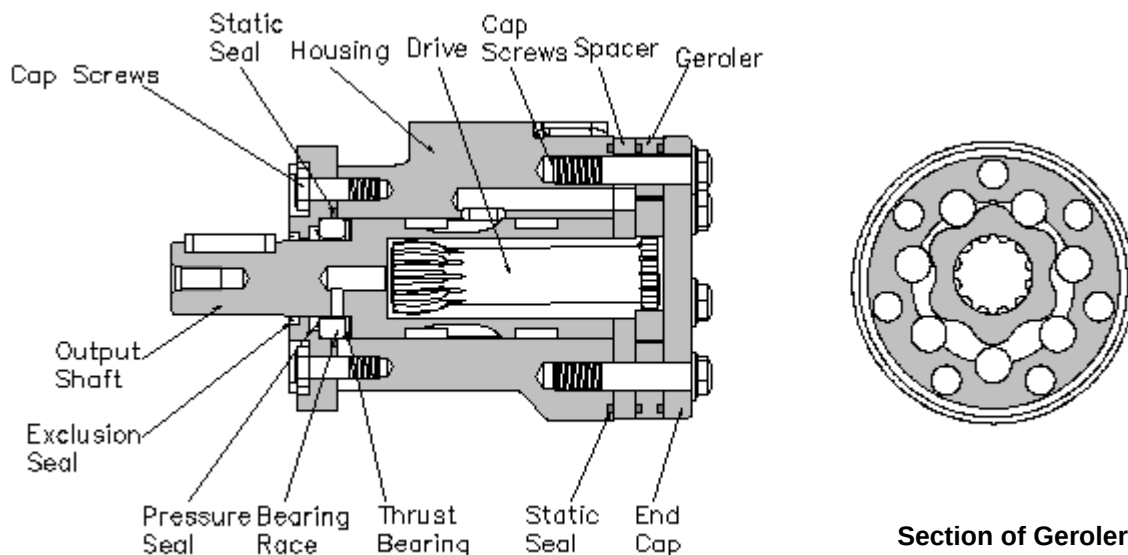
<u>Gerolor Element</u>	<u>9 Displacements</u>
<u>Flow L/min</u>	<u>57 Continuous***</u>
	<u>68 Intermittent**</u>
<u>Speed RPM</u>	<u>up to 875 RPM inter. **</u>
<u>ΔPressure bar</u>	<u>138 Cont. ***</u>
	<u>155 Inter. **</u>
<u>Torque Nm</u>	<u>473 Cont. ***</u>
	<u>512 Inter. **</u>

***Continuous-(Cont.) Continuous rating, motor may be run continuously at these ratings.

**Intermittent-(Inter.) Intermittent operation, 10% of every minute.

XCEL Spool Valve Motors

XCEL CS Series(036-)



• Specification Data

Displacement cc/r		50	80	100	130	160	195	245	305	395
Flow	Continuous	38	57	57	57	57	57	57	57	57
	Intermittent	45	68	68	68	68	68	68	68	68
Max. Speed (RPM)	Continuous	741	701	554	430	353	286	230	180	141
	Intermittent	875	830	665	515	425	344	275	215	171
Δ Pressure	Continuous	138	138	138	124	124	124	110	97	83
	Intermittent	155	155	155	138	138	138	124	110	90
Torque	Continuous	103	171	216	246	298	342	391	417	473
	Intermittent	116	192	241	273	328	379	437	444	512
Weight kg		6.3	7.0	7.5	7.7	7.7	8.0	8.4	9.4	9.6

A simultaneous maximum torque and maximum speed NOT recommended.

To assure best motor life, run motor for approximately **1 hour at 30%** of rated pressure before application to full load.

Be sure motor is filled with fluid prior to any load applications.

Recommended fluids: premium quality, anti-wear type hydraulic oil.

Minimum oil viscosity (at operating temperature): Never below 20cSt best viscosity range 20-32cSt.

Recommended maximum system operating temp.:82° C.

Recommended filtration: Per ISO Cleanliness Code 4406, level 20/18/13.

Maximum inlet pressure: 170bar without regard to Δ bar and /or back pressure ratings or combination thereof.

XCEL Spool Valve Motors

Performance Data XCEL CS Series(036-)

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

Performance data is typical

At 25cSt.

Actual data may vary slightly fi

Unit to unit in production.

 Continuous

 Intermittent

CS-50 [50.4cc/r]

		Δpressure Bar					Max.	
		Continuous					Cont.	Int
Flow LPM	7.6	28	55	69	97	110	124	138
		18	37	47	65	72	80	
		140	128	120	100	89	74	
		19	40	50	71	80	90	110
		287	274	266	246	235	220	205
Flow LPM	15.1	18	40	50	71	81	91	101
		436	422	414	394	381	366	351
		17	39	50	72	82	92	103
		592	577	569	550	539	527	510
		30.3	17	38	49	71	80	92
Max. Cont.	37.9	741	726	718	696	683	667	650
			36	47	69	79	90	101
			875	866	846	832	818	802
Int.	45.4							

36 Torque Nm
875 Speed RPM

CS-80 [80cc/r]

		Δpressure Bar					Max.	
		Continuous					Cont.	Int
Flow LPM	7.6	28	55	69	97	110	124	138
		33	65	81	110	122	135	
		89	80	75	60	53	46	
		35	68	85	119	134	149	165
		180	170	164	147	138	127	114
Flow LPM	15.1	33	68	85	120	135	152	169
		275	263	255	237	229	216	204
		31	65	84	121	136	154	171
		368	358	351	333	323	312	298
		28	62	81	118	133	152	169
Flow LPM	22.7	463	452	445	429	418	404	392
		37.9	25	59	77	114	149	166
		559	548	540	522	513	500	487
		45.4	18	52	71	108	126	143
		701	689	680	662	651	639	626
Max. Cont.	56.8		44	63	101	117	136	153
			830	822	800	790	779	766
Int.	68.0							

CS-100 [100cc/r]

		Δpressure Bar					Max.	
		Continuous					Cont.	Int
Flow LPM	7.6	28	55	69	97	110	124	138
		43	86	108	149	167	185	201
		73	68	65	58	53	46	42
		45	88	110	155	175	195	217
		145	140	137	129	124	119	111
Flow LPM	15.1	43	86	110	154	175	197	218
		220	215	211	202	198	191	184
		42	86	109	155	176	198	220
		295	292	287	279	274	268	261
		39	84	107	153	175	197	218
Flow LPM	22.7	370	366	361	353	347	340	331
		37.9	37	81	104	151	172	194
		445	439	436	428	421	416	406
		45.4	32	75	98	145	166	188
		563	552	548	545	534	526	517
Max. Cont.	56.8		24	69	93	138	160	183
			671	662	661	649	642	637
Int.	68.0							

XCEL Spool Valve Motors

Performance Data XCEL CS Series(036-)

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

Performance data is typical

At 25cSt.

Actual data may vary slightly from

Unit to unit in production.

 Continuous

 Intermittent

CS-130 [130cc/r]

		Δpressure Bar					Max.	
		Continuous					Cont.	Int
Flow LPM	7.6	28	55	69	97	110	124	138
		56	107	132	180	200	218	
	15.1	56	51	49	42	37	31	
		56	111	139	194	218	245	269
	22.7	113	108	105	98	94	88	82
		54	111	139	194	220	246	273
	30.3	170	165	163	156	152	147	141
		55	111	142	198	223	250	274
	37.9	231	227	225	219	214	210	204
		51	108	137	196	221	249	273
Max. Cont.	56.8	290	286	283	278	273	267	262
		48	104	133	192	218	246	271
Int.	68.0	347	343	340	334	330	325	318
		38	94	125	184	211	239	264
		436	432	428	422	418	412	407
		32	89	118	176	203	232	258
		522	518	515	508	503	498	492

CS-160 [157cc/r]

		Δpressure Bar					Max.	
		Continuous					Cont.	Int
Flow LPM	7.6	28	55	69	97	110	124	138
		66	131	164	225	254		
	15.1	47	45	43	38	35		
		67	134	168	234	264	297	328
	22.7	94	91	88	83	80	76	72
		63	131	165	232	264	296	328
	30.3	142	138	135	130	126	122	118
		66	132	169	237	268	301	339
	37.9	192	189	186	181	177	173	166
		61	129	166	234	265	298	337
Max. Cont.	56.8	241	236	234	227	223	218	212
		53	122	158	229	259	292	332
Int.	68.0	288	285	282	276	271	267	260
		45	114	148	218	251	283	322
		361	357	355	349	344	339	333
		37	103	138	207	239	274	308
		434	429	427	421	416	411	406

CS-195 [194cc/r]

		Δpressure Bar					Max.	
		Continuous					Cont.	Int
Flow LPM	7.6	28	55	69	97	110	124	138
		81	156	194	264	298		
	15.1	38	35	34	30	27		
		84	161	203	284	321	359	396
	22.7	76	74	72	67	65	62	58
		81	161	203	284	320	360	399
	30.3	114	111	110	104	102	99	96
		79	162	205	287	324	363	398
	37.9	154	153	150	144	140	136	139
		76	160	200	284	321	358	397
Max. Cont.	56.8	192	190	189	182	178	174	171
		67	151	193	277	314	353	391
Int.	68.0	233	228	228	221	216	214	209
		56	141	184	270	308	347	385
		272	269	266	259	256	251	248
		53	137	181	265	303	342	381
		292	287	285	279	275	271	266
			125	167	253	290	330	369
			345	344	337	333	329	325

XCEL Spool Valve Motors

Performance Data XCEL CS series(036-)

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

Performance data is typical

At 25cSt.

Actual data may vary slightly from

Unit to unit in production.

 Continuous

 Intermittent

CS-245 [243cc/r]

		Δpressure Bar				Max.	
		Continuous				Cont.	Int
		28	55	69	97	110	124
Flow LPM	7.6	101	196	246	340	380	
		31	29	28	25	23	
	15.1	104	205	256	357	400	449
		61	59	58	56	54	52
	22.7	98	203	257	330	399	446
		92	90	88	85	84	82
	30.3	98	204	256	357	401	450
		124	122	121	118	114	112
	37.9	91	196	252	352	398	443
		156	154	152	148	146	143
Max. Cont.	45.4	85	189	242	343	388	436
		186	185	184	179	176	173
	53.0	77	174	230	336	380	426
		218	216	214	210	208	204
Int.	56.8	73	173	226	329	374	424
		233	232	231	227	223	220
	68.0		158	209	316	358	408
			278	276	273	270	266

CS-305 [304cc/r]

		Δpressure Bar				Max.	
		Continuous				Cont.	Int
		28	55	69	97	103	110
Flow LPM	7.6	123	242	299	412		
		24	23	22	18		
	15.1	125	252	314	436	460	489
		49	47	46	43	43	41
	22.7	119	248	313	436	459	487
		74	72	71	69	68	67
	30.3	114	242	308	433	456	484
		99	98	97	94	93	92
	37.9	114	246	310	433	456	483
		124	123	122	119	118	118
Max. Cont.	45.4	102	233	298	420	446	474
		149	148	147	145	143	142
	53.0	98	216	285	409	432	465
		173	173	172	170	169	167
Int.	56.8	91	209	275	401	431	455
		186	186	185	183	181	180
	68.0		189	256	379	405	435
			223	222	220	219	217

CS-395 [392cc/r]

		Δpressure Bar				Max.	
		Continuous				Cont.	Int
		28	41	55	69	83	90
Flow LPM	7.6	150	225	303	374	439	478
		19	19	18	17	16	15
	15.1	160	237	316	396	471	508
		38	38	37	36	35	34
	22.7	161	238	315	395	466	512
		57	57	56	55	54	54
	30.3	151	235	320	402	478	512
		77	77	76	75	74	73
	37.9	144	225	313	390	471	504
		96	96	96	95	94	93
Max. Cont.	45.4	131	211	298	375	458	495
		116	115	115	114	113	112
	53.0	116	195	280	362	442	481
		135	135	134	134	133	132
Int.	56.8	105	186	272	353	431	469
		145	145	144	144	143	142
	68.0		172	248	332	409	446
			173	173	172	171	171

XCEL Spool Valve Motors

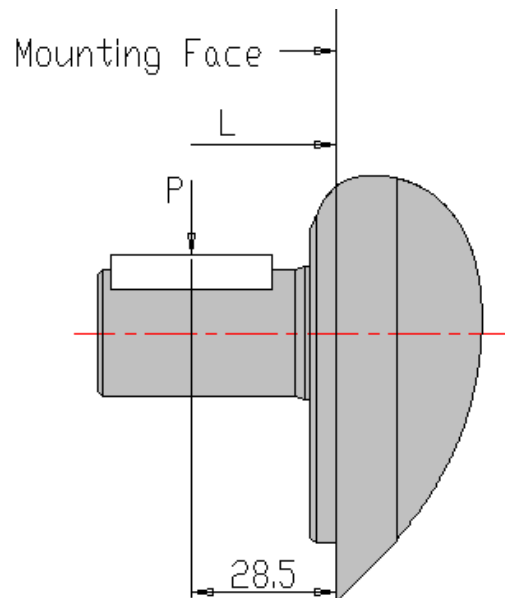
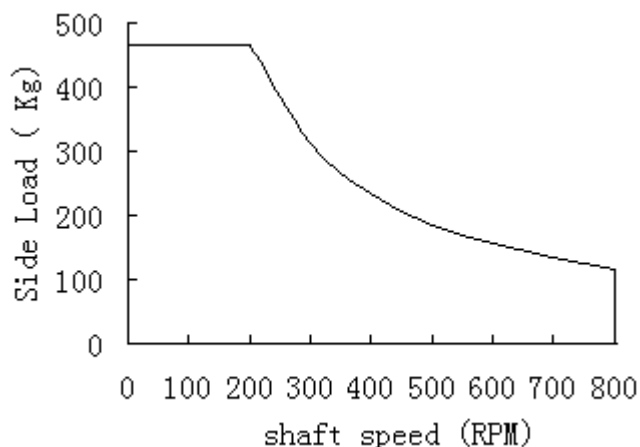
• Shaft Side Load Capacity

$$\text{Side Load } P = \frac{800}{N} \left(\frac{15000}{L+100} \right) \quad \text{from 200-800RPM}$$

Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface (mm)

P=Side Load (Kg)



• Case Pressure /Shaft Seal

Refer to the Case Pressure/Shaft Seal chart below.

Allowable case pressure is highest at low shaft speeds.

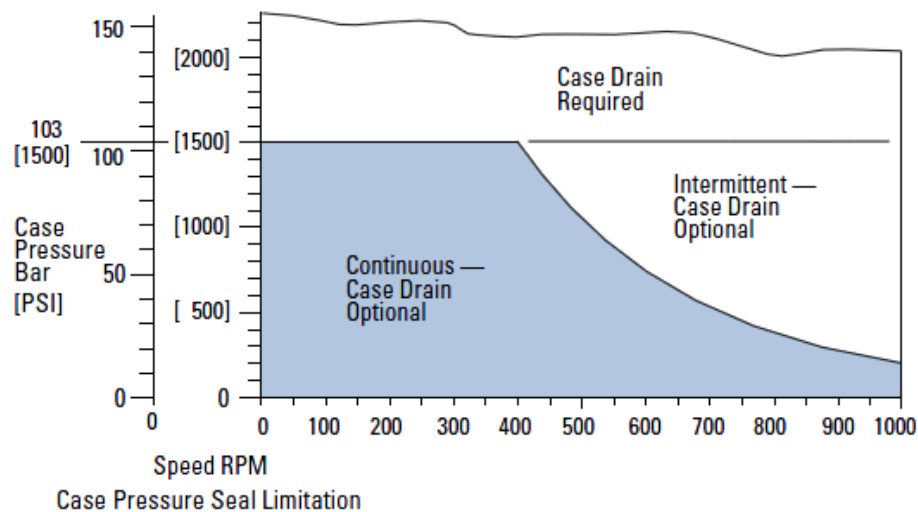
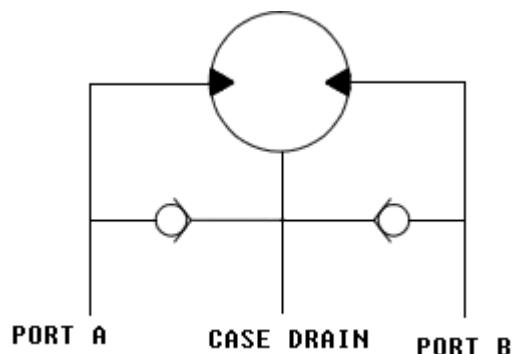
Motor life will be shortened if case pressure exceeds

recommended ratings (acceptability may vary

with application).

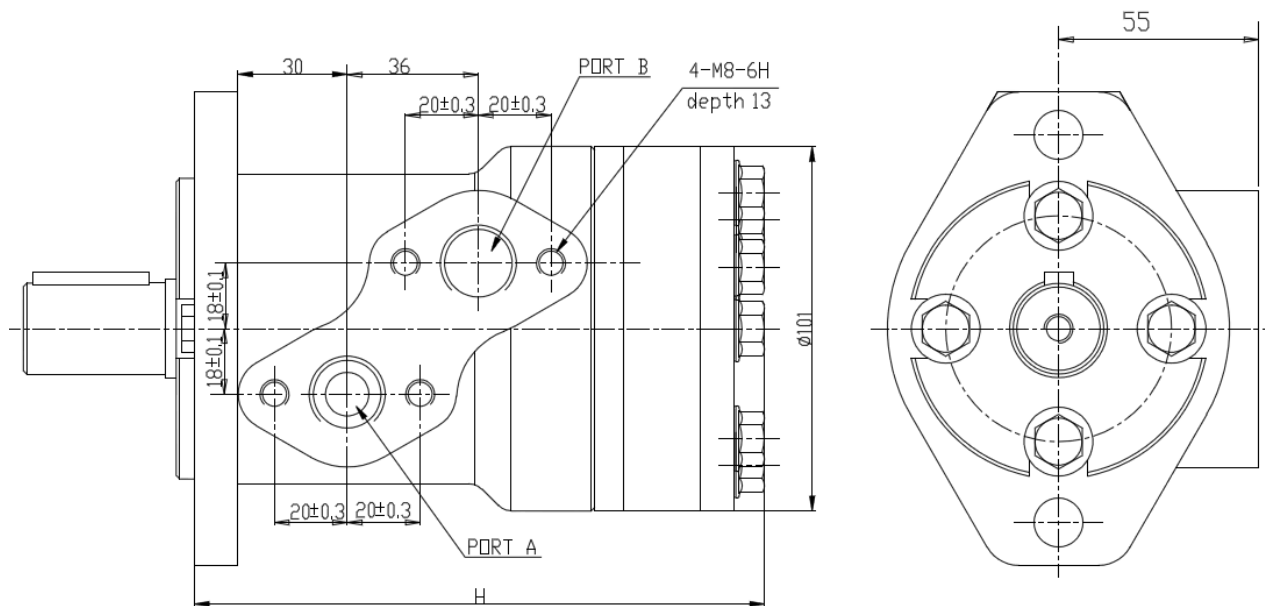
With check valves as standard, case pressure can be

considered the same as the outlet / pressure / back pressure.



XCEL Spool Valve Motors

Dimensions XCEL CS Series---Outline



Displacement cc/r	50	80	100	130	160	195	245	305	395
H mm *	149	156	160	167	167	177	183	194	210

* Based on the mounting flange SAE A.

Standard direction of rotation: CW - When A port pressurized
(Viewed from the shaft end)

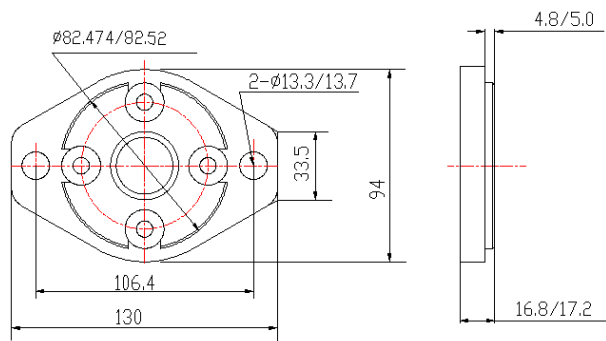
Mounting Flange

Code AA

SAE A

2-Ø13.5

Ø82.55x5 pilot



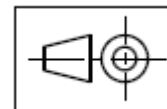
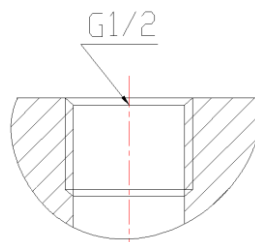
Main Port Thread

Code 01

G main port

ISO228/1

G1/2



XCEL Spool Valve Motors

Dimensions XCEL CS Series--- Output Shaft

6B splined shaft are recommended Whenever operation above 260NM of torque, especially for those applications subject to frequent reversals.

Code 01

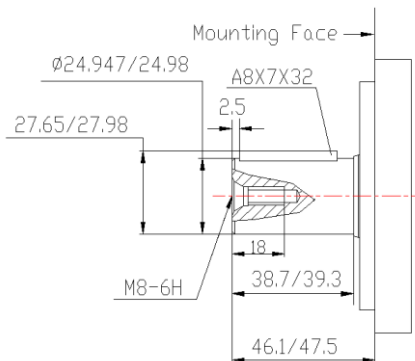
standard straight.

25mm Dia.,

Parallel key

A 8x7x32

DIN 6885



Code 02

straight.

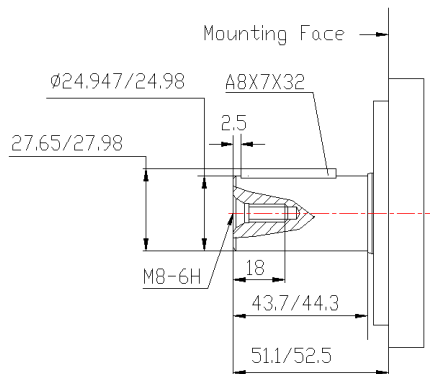
5mm extra length

25mm Dia.,

Parallel key

A8x7x32

DIN6885



Code 03

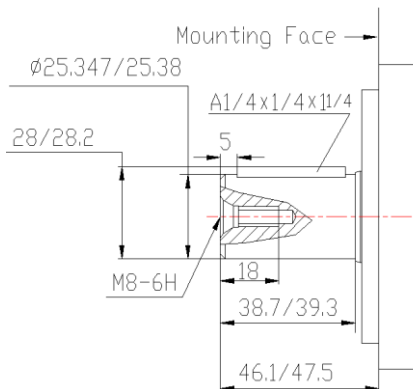
standard straight.

1 in Dia.,

Parallel key

BS 46

A1/4x1/4x11/4



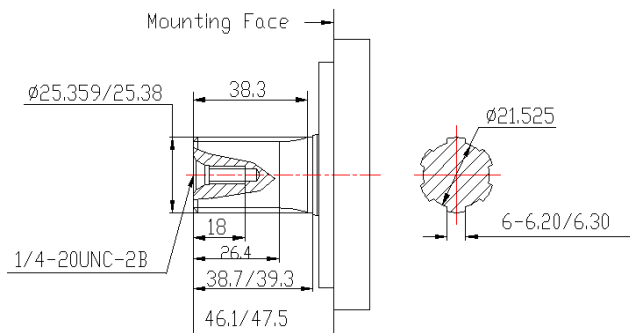
Code 04

Splined shaft.

1 in

BS2059

SAE 6B



XCEL Spool Valve Motors

XCEL CS series(036-)

Part numbers

Use digit prefix —036- plus four digit number from

Charts for complete product number—Example

036-0029. Orders will not be accepted without three

Digit prefix.

Model Code:

The motor part numbers above are based on the model code

MCS * AA ** AA010000A000B00B**

Shaft Options

Displacement options

See page 11 for full model code

Port	Flange &Pilot	Shaft Code	Output Shaft	Displacement cc/r								
				50	80	100	130	160	195	245	305	395
Staggered Ports G ½" BSP	2-bolt Pilot Φ82.55 Length 5mm	01	Straight shaft Standard Φ25, Key A8X7X32,	036- 0001	-0002	-0003	-0004	-0005	-0006	-0007	-0008	-0009
		02	Straight shaft Standard Φ25, Key A8X7X32 5mm extra length	036- 0010	-0011	-0012	-0013	-0014	-0015	-0016	-0017	-0018
		03	Straight shaft Standard Φ1 in, Key A1/4X1/4X11/4	036- 0019	-0020	-0021	-0022	-0023	-0024	-0025	-0026	-0027
		04	splined shaft Φ1 in SAE 6B	036- 0028	-0029	-0030	-0031	-0032	-0033	-0034	-0035	-0036

036-0029

CS Series(036-)

Model Code

The following 26-digit coding system has been developed to identify all of the configuration options for the CH motor. Use this model code to specify a motor with the desired features. All 26-digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

M	CS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	

Position 1 : Product Series

M Motor

Position 2, 3: Motor Series

CS CS Series Motor

Position 4, 5,6: Displacement cc/r [in³/r]

050	50
080	80
100	100
130	130
160	160
195	195
245	245
305	305
395	395

Position 7,8:Mounting Flange

AA Two bolt SAE A.
2-φ13.5 diamond flange, pilot φ82.55x5

Position 9, 10:Output Shaft

01.	25 Dia. Standard straight, parallel key A8X7X32, M8 hole in shaft end. DIN 6885
02.	25 Dia. Straight, 5mm extra length. parallel key A8X7X32, M8 hole in shaft end. DIN 6885
03.	25.4Dia. Standard straight, parallel key 1/4x11/4x11/4, M8 hole in shaft end .BS 46
04.	25.4Dia. Splined shaft, SAE 6B, 1/4-20UNC- 2B hole in shaft end. BS2059

Position 11,12:Main Ports

AA staggered port 2-G1/2 ISO228/1

Position 13:Case drain options

0	None (Standard)
1	G1/4 ISO228/1

Position 14: Gerolor Options

1	Standard Gerolor
---	------------------

Position 15: Shaft options

0	standard shaft
---	----------------

Position 16,17: Seal option

00	Standard seals
----	----------------

Position 18: Speed Sensor Options

0	None
---	------

Position 19: Manifold Block Options

A	None
---	------

Position 20,21: Special Features (Hardware)

00	None
----	------

Position 22:Special Assembly Instructions

0	None
1	Reverse Rotation

Position 23: Paint

A	No Paint
B	Blue Primer
C	Black Primer

Position 24,25 Assigned Code When Applicable

00	None
----	------

Position 26 Design Code

B	Second(2)
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