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 Application Engineering Europe

ELECTRONIC EXPANSION VALVES EX4-7-...FLR



General information

Electrical Control Valves Series EX4-7-...FLR are stepper motor driven valves for precise control of refrigerant mass flow in air conditioning, refrigeration, heat pumps, close control and industrial process cooling applications.

NOTE: Product types for safety class A1 / A2L, please refer to separate documents.



EX5-U21-FLR



EX7-...FLR

Features

- Fully hermetic design
- Stepper motor driven
- Short opening and closing time
- Very fast full stroke time
- High resolution and excellent repeatability
- Bi-flow versions with positive shut-off in both flow directions
- Positive shut off function eliminates the use of an additional solenoid valve
- Linear flow capacity
- Extremely wide capacity range (10...100 %)
- Continuous modulation of mass flow
- Direct coupling of motor and valve for high reliability (no gear mechanism)
- Ceramic slide and port for accurate flow and minimal wear
- Corrosion resistant stainless-steel body and connections

Selection Table

Type	Part No.	Connection ODF		Flow pattern	Nominal Capacity (kW)			Electrical connector
		Inlet	Outlet		R290	R1270	R600a	
EX4-I21FLR	800430	3/8"	5/8"	Uni-flow	17	19	11	M12
EX4-M21 FLR	800431	10 mm	16 mm		17	19	11	
EX5-U21 FLR	800432	5/8" (16 mm)	7/8" (22 mm)		51.6	58	34	
EX6-I21 FLR	800433	7/8"	1-1/8"		124	139	83	
EX6-M21 FLR	800434	22 mm	28 mm		124	139	83	
EX7-I21 FLR	800440	1-1/8"	1-1/8"		340	383	227	
EX7-M21 FLR	800441	28 mm	28 mm		340	383	227	
EX4-U31 FLR	800435	5/8" (16 mm)	5/8" (16 mm)	Bi-flow (heat pumps)	17	19	11	
EX5-U31 FLR	800436	7/8" (22 mm)	7/8" (22 mm)		51.6	58	34	
EX6-I31 FLR	800437	1-1/8"	1-1/8"		124	139	83	
EX6-M31 FLR	800438	28 mm	28 mm		124	139	83	
EX7-U31FLR	800442	1-1/8"	1-1/8"		340	383	227	
EX7-M31FLR	800443	28 mm	28 mm		340	383	227	

NOTE 1: *) EX4-7-...FLR are delivered without cable/connector assembly -to be ordered separately.

NOTE 2: The nominal capacities are based +4°C evaporating temperature, +38°C condensing temperature and 1 K subcooling. For other operating conditions use the quick selection in this document or "Select" tool (www.climate.emerson.com/en-gb). For assistance with selection, please contact your local Emerson Sales offices.

Selection Table Accessory

Type	Part No.	Temperature Range	Length	Connector Type to valve	Connector type to controller	Illustration
EXV-M60FLR	804666	-50...+70°C	6.0 m	M12 plug	Loose wires	
EVC05A	800439	-20...+60°C	6.0 m	M12 plug	Loose wires	

EX-FLR - Quick selection (included 1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature (°C)	R290		Capacity (kW)										R290		Valve Type
	Evaporating temperature (°C)														
	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40			
75	15	15	15	15	14	14	14	13	13	12	12	11	EX4-...FLR		
	46	46	45	44	43	42	41	40	38	37	35	34	EX5-...FLR		
	110	110	108	106	104	102	99	96	92	89	85	81	EX6-...FLR		
	304	301	298	293	287	280	272	263	254	244	234	223	EX7-...FLR		
70	16	16	16	16	15	15	15	14	14	14	13	13	EX4-...FLR		
	48	48	48	47	47	46	45	44	42	41	40	38	EX5-...FLR		
	116	116	115	114	112	110	108	105	102	98	95	91	EX6-...FLR		
	319	318	316	313	308	303	296	288	280	271	261	251	EX7-...FLR		
65	16	16	16	16	16	16	16	15	15	15	14	14	EX4-...FLR		
	50	50	50	50	49	48	48	47	45	44	43	42	EX5-...FLR		
	119	120	120	119	118	116	114	112	109	106	103	100	EX6-...FLR		
	327	329	329	327	324	320	314	308	300	292	283	274	EX7-...FLR		
60	16	17	17	17	17	17	17	16	16	16	15	15	EX4-...FLR		
	50	51	51	51	51	50	50	49	48	47	46	44	EX5-...FLR		
	120	121	122	122	122	121	119	117	115	112	109	106	EX6-...FLR		
	329	334	336	336	335	332	327	322	316	309	301	292	EX7-...FLR		
55	16	17	17	17	17	17	17	17	16	16	16	15	EX4-...FLR		
	49	50	51	51	52	51	51	50	50	49	48	46	EX5-...FLR		
	118	121	123	124	124	123	122	121	119	117	114	111	EX6-...FLR		
	325	333	337	340	340	339	336	332	327	321	314	306	EX7-...FLR		
50	16	16	17	17	17	17	17	17	17	16	16	16	EX4-...FLR		
	48	49	51	51	52	52	52	51	51	50	49	48	EX5-...FLR		
	115	119	121	123	124	124	124	123	121	120	117	115	EX6-...FLR		
	316	326	334	338	341	341	340	338	334	329	323	316	EX7-...FLR		
45	15	16	16	17	17	17	17	17	17	17	16	16	EX4-...FLR		
	45	48	49	50	51	51	52	51	51	50	50	49	EX5-...FLR		
	109	114	118	121	123	123	124	123	122	121	119	117	EX6-...FLR		
	299	314	325	332	337	340	340	339	337	333	328	322	EX7-...FLR		
40	14	15	16	16	16	17	17	17	17	17	16	16	EX4-...FLR		
	42	45	47	49	50	51	51	51	51	50	50	49	EX5-...FLR		
	100	107	113	117	120	121	122	122	122	121	120	118	EX6-...FLR		
	275	295	310	321	329	333	336	337	336	333	330	325	EX7-...FLR		
35	12	13	14	15	16	16	16	17	17	17	16	16	EX4-...FLR		
	37	41	44	46	48	49	50	50	50	50	50	49	EX5-...FLR		
	88	98	105	111	115	117	119	120	120	120	119	118	EX6-...FLR		
	242	270	290	305	315	323	328	330	331	330	328	324	EX7-...FLR		
30	10	12	13	14	15	15	16	16	16	16	16	16	EX4-...FLR		
	30	36	40	43	45	47	48	49	49	49	49	49	EX5-...FLR		
	71	85	95	103	108	112	115	116	117	118	117	116	EX6-...FLR		
	196	235	262	282	297	308	315	320	323	323	323	320	EX7-...FLR		
20	0	5	9	11	12	13	14	14	15	15	15	15	EX4-...FLR		
	0	16	26	32	37	40	42	44	45	45	46	46	EX5-...FLR		
	0	39	63	78	88	95	101	104	107	109	110	110	EX6-...FLR		
	0	107	174	214	242	262	277	287	295	299	302	303	EX7-...FLR		

EX4-7-...FLR - Quick selection (included 1.5 bar pressure drop for liquid line components and distributor)




Condensing temperature (°C)	R1270		Capacity (kW)										R1270		Valve Type
	Evaporating temperature (°C)														
	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40			
75	17	17	17	17	16	16	16	15	15	14	14	13	EX4-...FLR		
	51	51	51	50	49	48	47	46	45	43	42	40	EX5-...FLR		
	122	122	121	120	118	116	114	111	108	104	100	97	EX6-...FLR		
	336	336	334	330	325	319	312	304	296	286	276	266	EX7-...FLR		
70	18	18	18	18	18	17	17	17	16	16	15	15	EX4-...FLR		
	54	54	54	54	53	53	52	51	49	48	47	45	EX5-...FLR		
	129	130	130	129	128	126	124	122	119	116	112	109	EX6-...FLR		
	355	357	357	355	352	347	341	334	326	318	309	299	EX7-...FLR		
65	18	19	19	19	19	18	18	18	18	17	17	16	EX4-...FLR		
	55	56	56	56	56	56	55	54	53	52	51	49	EX5-...FLR		
	133	135	135	135	135	133	132	130	127	125	122	118	EX6-...FLR		
	366	370	372	372	370	367	363	357	350	343	334	325	EX7-...FLR		
60	18	19	19	19	19	19	19	19	18	18	18	17	EX4-...FLR		
	56	57	58	58	58	58	57	57	56	55	54	52	EX5-...FLR		
	135	137	138	139	139	139	137	136	134	131	129	126	EX6-...FLR		
	370	377	381	383	383	381	378	373	368	361	354	346	EX7-...FLR		
55	18	19	19	19	19	19	19	19	19	19	18	18	EX4-...FLR		
	56	57	58	59	59	59	59	58	58	57	56	55	EX5-...FLR		
	133	137	139	141	142	142	141	140	138	136	134	131	EX6-...FLR		
	367	376	383	387	389	389	388	385	380	375	369	361	EX7-...FLR		
50	18	18	19	19	20	20	20	20	19	19	19	19	EX4-...FLR		
	54	56	58	59	59	59	59	59	59	58	57	56	EX5-...FLR		
	130	134	138	140	142	143	143	142	141	140	138	135	EX6-...FLR		
	357	370	380	386	391	393	393	391	388	384	378	372	EX7-...FLR		
45	17	18	19	19	19	20	20	20	20	19	19	19	EX4-...FLR		
	51	54	56	58	59	59	60	60	59	59	58	57	EX5-...FLR		
	123	130	135	138	141	142	143	143	142	141	140	138	EX6-...FLR		
	339	357	370	380	387	391	393	393	391	388	384	379	EX7-...FLR		
40	16	17	18	18	19	19	19	20	20	19	19	19	EX4-...FLR		
	48	51	54	56	57	58	59	59	59	59	58	58	EX5-...FLR		
	114	123	129	134	137	140	141	142	142	141	140	139	EX6-...FLR		
	314	337	355	368	378	384	388	390	390	389	386	382	EX7-...FLR		
35	14	15	17	18	18	19	19	19	19	19	19	19	EX4-...FLR		
	42	47	50	53	55	57	58	58	58	58	58	58	EX5-...FLR		
	102	113	121	127	132	136	138	139	140	140	140	139	EX6-...FLR		
	280	310	333	351	364	373	380	384	385	385	384	381	EX7-...FLR		
30	12	14	15	16	17	18	18	19	19	19	19	19	EX4-...FLR		
	35	41	46	49	52	54	55	56	57	57	57	57	EX5-...FLR		
	84	99	110	119	125	130	133	135	137	138	138	137	EX6-...FLR		
	231	273	304	327	344	357	366	373	376	378	378	377	EX7-...FLR		
20		7	11	13	14	15	16	17	17	18	18	18	EX4-...FLR		
		22	32	39	43	47	49	51	52	53	54	54	EX5-...FLR		
		53	77	93	104	112	118	123	126	128	129	130	EX6-...FLR		
		146	212	255	285	308	325	338	346	352	356	358	EX7-...FLR		

EX4-7-...FLR - Quick selection (included 1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature (°C)	R600a		Capacity (kW)										R600a		Valve Type
	Evaporating temperature (°C)														
	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40			
75	11.7	11.5	11.3	10.6	10.8	10.4	10.1	9.7	9.3	8.5	8.5	8.0	EX4-...FLR		
	35	35	34	32	33	32	31	29	28	26	26	24	EX5-...FLR		
	85	84	83	77	79	76	74	71	68	62	62	59	EX6-...FLR		
	234	230	226	212	215	209	202	194	186	170	170	161	EX7-...FLR		
70	11.7	11.6	11.4	10.8	11.0	10.7	10.4	10.1	9.7	9.0	9.0	8.6	EX4-...FLR		
	35	35	35	33	33	33	32	31	29	27	27	26	EX5-...FLR		
	85	84	83	79	80	78	76	73	71	65	65	62	EX6-...FLR		
	233	231	229	215	220	214	208	202	194	179	179	171	EX7-...FLR		
65	11.5	11.5	11.4	10.8	11.1	10.9	10.6	10.3	10.0	9.3	9.3	8.9	EX4-...FLR		
	35	35	35	33	34	33	32	31	30	28	28	27	EX5-...FLR		
	84	84	83	79	81	79	77	75	73	68	68	65	EX6-...FLR		
	229	229	228	216	222	217	212	206	200	185	186	179	EX7-...FLR		
60	11.1	11.2	11.2	10.7	11.0	10.9	10.7	10.4	10.2	9.4	9.5	9.2	EX4-...FLR		
	34	34	34	32	34	33	32	32	31	29	29	28	EX5-...FLR		
	81	82	82	78	81	79	78	76	74	69	70	67	EX6-...FLR		
	222	224	224	214	221	218	213	209	203	189	191	184	EX7-...FLR		
55	10.5	10.7	10.9	10.4	10.9	10.8	10.6	10.4	10.2	9.5	9.7	9.4	EX4-...FLR		
	32	33	33	32	33	33	32	32	31	29	29	28	EX5-...FLR		
	77	78	79	76	79	78	77	76	74	69	70	68	EX6-...FLR		
	210	215	217	209	217	215	212	208	204	190	193	187	EX7-...FLR		
50	9.7	10.1	10.3	10.0	10.5	10.5	10.4	10.3	10.1	9.5	9.6	9.4	EX4-...FLR		
	30	31	31	30	32	32	32	31	31	29	29	28	EX5-...FLR		
	71	74	75	73	77	77	76	75	74	69	70	68	EX6-...FLR		
	194	202	207	201	210	210	208	205	202	189	193	188	EX7-...FLR		
45	8.7	9.2	9.6	9.5	10.0	10.1	10.1	10.0	9.9	9.3	9.5	9.3	EX4-...FLR		
	26	28	29	29	30	31	31	30	30	28	29	28	EX5-...FLR		
	63	67	70	69	73	74	73	73	72	68	69	68	EX6-...FLR		
	173	185	193	189	201	202	201	200	197	186	190	186	EX7-...FLR		
40	7.2	8.1	8.7	8.7	9.4	9.5	9.6	9.6	9.5	9.0	9.2	9.1	EX4-...FLR		
	22	25	26	26	28	29	29	29	29	27	28	28	EX5-...FLR		
	53	59	63	64	68	69	70	70	69	66	67	66	EX6-...FLR		
	145	162	174	174	187	190	191	191	190	180	185	181	EX7-...FLR		
35	5.1	6.5	7.4	7.7	8.5	8.8	8.9	9.0	9.0	8.6	8.9	8.7	EX4-...FLR		
	16	20	23	23	26	27	27	27	27	26	27	26	EX5-...FLR		
	37	48	54	56	62	64	65	66	66	63	65	64	EX6-...FLR		
	103	131	149	154	169	175	178	180	180	172	177	175	EX7-...FLR		
30		4.1	5.7	6.4	7.3	7.8	8.1	8.2	8.3	8.0	8.3	8.3	EX4-...FLR		
		13	17	19	22	24	24	25	25	24	25	25	EX5-...FLR		
		30	42	47	53	57	59	60	61	58	61	60	EX6-...FLR		
		83	114	128	147	155	161	165	167	160	167	165	EX7-...FLR		
20					3.4	4.7	5.5	6.0	6.4	6.4	6.8	6.8	EX4-...FLR		
					10	14	17	18	19	19	21	21	EX5-...FLR		
					24	34	40	44	47	46	49	50	EX6-...FLR		
					67	94	110	121	128	127	135	136	EX7-...FLR		

Technical Data

Max. allowable Pressure PS	35 bar
Max. System Test Pressure PT	38.5 bar
MOPD (Max. operating pressure differential)	30 bar
Temperatures	Ambient: -20...+60°C Storage: -40...+70°C Operating/ Medium Inlet: Uni-flow: -50...+100°C Bi-flow: -40...+80°C
Material	Body: Stainless steel Connections: ODF Stainless steel
Weight	EX4-...FLR: 0.5 kg EX5-...FLR: 0.52 kg EX6-...FLR: 0.60 kg EX7-...FLR: 1.1 kg
Accessories	M12 Connector EXV-M60-FLR / EVC05A

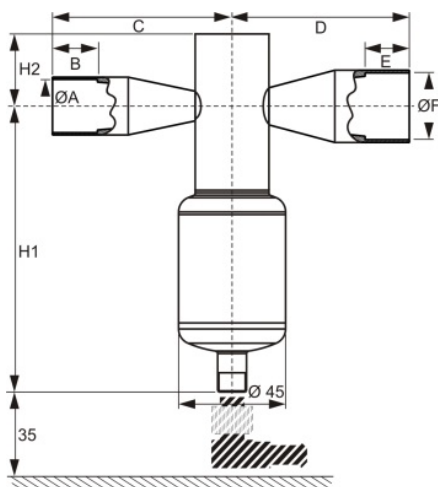
Protection Class (IEC 529, DIN 40050)	IP67 (via EVC05A/ EXV-M60-FLR)
Vibration for non-connected and fastened valve	4g (0...1000 Hz, 1 octave/min.)
Humidity	5...95 % r.H.
Released Refrigerants	Fluid group I R290, R1270, R600a A3
NOTE: Fluid Group acc. to PED 2014/68/EU.	
Shock	20 g at 11 ms 80 g at 1 ms
Markings	 (2014/34/EU),   II 3G Ex nA IIA T3 Gc X
Package and Delivery	Single pack without electrical connector

Electrical Data

Stepper motor type	Bi-polar, phase current by chopper control (constant current)
Electrical connection	4 pin terminal via plug
Recom. driver supply	24 VDC (nominal)
Driver supply voltage range	18...36 VDC
Phase current, operating	EX4/5/6-...FLR: 500 mA, -10 % EX7-...FLR: 750 mA, ±10 %
Holding current	EX4/5/6-...FLR: 100 mA EX7-...FLR: 250 mA
Nominal input power per phase	EX4/5/6-...FLR: 3.5 W EX7-...FLR: 5 W
Stepping rate	50 Hz

Phase inductance	EX4/5/6-...FLR: 30 mH ± 25 % EX7-...FLR: 20 mH ± 25 %
Step mode	2 phase full step
Step angle	1.8° per step ± 8 %
Reference position	Mechanical stop at fully close position
Total number of steps	EX4/5/6-...FLR: 750 full steps EX7-...FLR: 1600 full steps
Winding resistance per phase	EX4/5/6-...FLR: 14 Ω ±10 % EX7-...FLR: 10 Ω ±10 %
Full travel time	EX4/5/6-...FLR: 1.5 seconds EX7-...FLR: 3.2 seconds

Dimension (mm)



	EXV	Part No.	Ø A x Ø F (ODF)	B	C	D	E	H1	H2
Uni-flow	EX4-I21FLR	800430	3/8" x 5/8"	8	45	55	11	113	25
	EX4-M21FLR	800431	10 x 16 mm	8	45	55	11	113	25
	EX5-U21FLR	800432	5/8" x 7/8" (16 x 22mm)	11	55	65	16	113	25
	EX6-I21FLR	800433	7/8" x 1-1/8"	16	65	75	19	113	25
	EX6-M21FLR	800434	22 x 28 mm	16	65	75	19	113	25
	EX7-I21FLR	800440	1-1/8" x 1-1/8"	20	78	83	20	158	42
	EX7-M21FLR	800441	28 x 28 mm	20	78	83	20	158	42
Bi-flow	EX4-U31FLR	800435	16 x 16 mm (5/8" x 5/8")	11	55	55	11	113	25
	EX5-U31FLR	800436	7/8" x 7/8" (22 x 22mm)	16	65	65	16	113	25
	EX6-I31FLR	800437	1-1/8" x 1-1/8"	19	75	75	19	113	25
	EX6-M31FLR	800438	28 x 28 mm	19	75	75	19	113	25
	EX7-I31FLR	800442	1-1/8" x 1-1/8"	20	83	83	20	158	42
EX7-M31FLR	800443	28 x 28 mm	20	83	83	20	158	42	

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