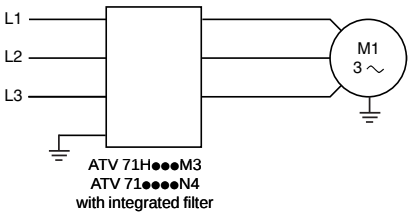
Variable speed drives for asynchronous motors

Altivar 71: CEM filters

Integrated filters and additional filters in option

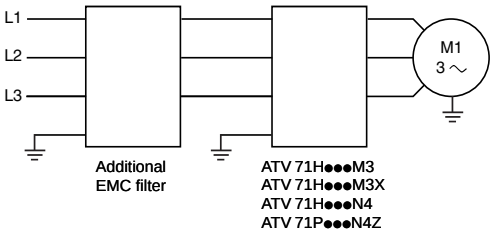


ATV 71H●●●M3
ATV 71●●●●N4
with integrated filter

CEM integrated filters

Altivar 71 drives, except for the ATV 71H●●●M3X, have built-in radio interference input filters to meet the EMC standard for variable speed electrical power drive "products" IEC/EN 61800-3, edition 2, category C2 or C3 in environment 1 or 2 and to comply with the European directive on EMC (electromagnetic compatibility).

For drives	Maximum length of shielded cable according to EN 55011 class A *(1)*			
	Group 1 *(2)*		Group 2 *(2)*	
	IEC/EN 61800-3 category C2 *(2)*		IEC/EN 61800-3 category C3 *(2)*	
	LF *(3)*	HF *(3)*	LF *(3)*	HF *(3)*
	m	m	m	m
ATV 71H037M3…HU22M3	10	5	–	–
ATV 71HU30M3…HU75M3	–	–	10	5
ATV 71H075N4…HU40N4 ATV 71W075N4…WU40N4 ATV 71P075N4Z…PU40N4Z	10	5	–	–
ATV 71HU55N4…HD15N4 ATV 71WU55N4…WD15N4 ATV 71PU55N4Z…PU75N4Z	–	–	10	5
ATV 71HD18N4…HC50N4 ATV 71WD18N4…WD75N4	–	–	50	25



ATV 71H●●●M3
ATV 71H●●●M3X
ATV 71H●●●N4
ATV 71P●●●N4Z

Additional EMC input filters

Applications

Additional EMC input filters can be used to meet more stringent requirements and are designed to reduce conducted emissions on the line supply below the limits of standards EN 55011 group 1, class A or B and IEC/EN 61800-3 category C2 or C3 (see page 60281/2).
For ATV 71H●●●M3, ATV 71HD11M3X…HD45M3X, ATV 71H075N4…HD75N4 and ATV 71P075N4Z…PU75N4Z drives, the additional EMC filters can be mounted beside or under the device. They act as a support for the drives and are attached to them via tapped holes.
For ATV 71HD55M3X, HD75M3X and ATV 71HD90N4…HC50N4 drives, the additional EMC filters can only be mounted beside the drive.

Use according to the type of network

Use of these additional filters is only possible on TN (connected to neutral) and TT (neutral to earth) type networks.

Standard IEC/EN 61800-3, appendix D2.1, states that on IT networks (impedance or isolated neutral), filters can cause permanent insulation monitors to operate in a random manner.
In addition, the effectiveness of additional filters on this type of network depends on the type of impedance between neutral and earth, and therefore cannot be predicted.
In the case of a machine which needs to be installed on an IT network, the solution would be to insert an isolation transformer and place the machine locally on a TN or TT network.

(1) Maximum lengths for shielded cables connecting motors to drives, for a factory-set switching frequency of 2.5 or 4 kHz depending on the rating see page 60281/4. If motors are connected in parallel, it is the sum of all cable lengths that should be taken into account.
(2) See page 60281/2.
(3) LF: low switching frequency. HF: high switching frequency. These frequencies depend on the drive rating:

For drives	Switching frequency	
	LF	HF
	kHz	kHz
ATV 71H●●●M3 ATV 71H075N4…HD30N4 ATV 71W075N4…WD30N4 ATV 71P075N4Z…PU75N4Z	4	4.1…16
ATV 71HD37N4…HD75N4 ATV 71WD37N4…WD75N4	2…2.5	2.6…12
ATV 71HD90N4…HC50N4	2…4	4.1…8

Characteristics: page 60290/3
References: pages 60290/4 and 60290/5
Dimensions: pages 60294/22 and 60294/23
Schemes: page 60295/13

Variable speed drives for asynchronous motors

Altivar 71: CEM filters

Option: Input additional filters

General characteristics

EMC filter type			VW3 A4 401…408	VW3 A4 410…413
Conformity to standards			EN 133200	
Degree of protection			IP 20 and IP 41 on upper part	IP 00 IP 30 with kits VW3 A9 601, 602
Maximum relative humidity			93% without condensation or dripping water conforming to IEC 68-2-3	
Ambient air temperature around the device	Operation	**°C**	-10…+50	-25…+45
	Storage	**°C**	-40…+65	-25…+85
Maximum operating altitude		**m**	1000 without derating 1000…3000 derating the current by 1% per additional 100 m. Limited to 2000 m for the “Corner Grounded” distribution network	
Vibration resistance			1.5 mm peak to peak from 3…13 Hz, 1 gn peak from 13…150 Hz, in accordance with IEC 60068-2-6	
Shock resistance			15 gn for 11 ms conforming to IEC/EN 60068-2-27	
Maximum nominal voltage	50/60 Hz 3-phase	**V**	240 +10% 480 +10%	

Connection characteristics

Maximum connection capacity and tightening torque	VW3 A4 401		4 mm^2 (AWG 10). 0.6 Nm
	VW3 A4 402		6 mm^2 (AWG 8). 1.5 Nm
	VW3 A4 403		10 mm^2 (AWG 6). 1.5 Nm
	VW3 A4 404		16 mm^2 (AWG 4). 2 Nm
	VW3 A4 405…407		50 mm^2 (AWG 0). 6 Nm
	VW3 A4 408		150 mm^2 (300 kcmil). 25 Nm
	VW3 A4 409		25 mm^2 (AWG 2). 4 Nm
	VW3 A4 410…412		Bar connection, M10 –
	VW3 A4 413		Bar connection, 2 x M12 –

Presentation: page 60290/2
References: pages 60290/4 and 60290/5
Dimensions: pages 60294/22 and 60294/23
Schemes: page 60295/13

Variable speed drives for asynchronous motors

Altivar 71: CEM filters

Option: Input additional filters

Additional EMC input filters

For drives	Maximum length of shielded cable (1)				In (2)	Il (3)	Loss (4)	Reference	Weight
	EN 55011 (5) class A Gr1 IEC/EN 61800-3 category C2 (5)		EN 55011 (5) class B Gr1 IEC/EN 61800-3 category C1 (5)						
	LF (6)	HF (6)	LF (6)	HF (6)					
	m	m	m	m	A	mA	W		kg
3-phase supply voltage: 200…240 V 50/60 Hz									
ATV 71H037M3…HU15M3	100	50	50	20	12	4	10	**VW3 A4 401**	2.200
ATV 71HU22M3…HU40M3	100	50	50	20	26	4.4	18	**VW3 A4 402**	4.000
ATV 71HU55M3	100	50	50	20	35	3	24	**VW3 A4 403**	5.800
ATV 71HU75M3	100	50	50	20	46	10	19	**VW3 A4 404**	7.000
ATV 71HD11M3X, HD15M3X	100	50	50	25	72	33	34	**VW3 A4 405**	12.000
ATV 71HD18M3X, HD22M3X	100	50	50	25	90	33	34	**VW3 A4 406**	15.000
ATV 71HD30M3X...HD45M3X	100	50	50	25	180	80	58	**VW3 A4 408**	40.000
ATV 71HD55M3X, HD75M3X	100	50	50	25	273	285	60	**VW3 A4 410**	22.000
3-phase supply voltage: 380…480 V 50/60 Hz									
ATV 71H075N4…HU22N4 ATV 71W075N4…WU22N4 ATV 71P075N4Z…PU22N4Z	100	50	50	20	12	7	5	**VW3 A4 401**	2.200
ATV 71HU30N4, HU40N4 ATV 71WU30N4, WU40N4 ATV 71PU30N4Z, PU40N4Z	100	50	50	20	26	8	6	**VW3 A4 402**	4.000
ATV 71HU55N4, HU75N4 ATV 71WU55N4,WU75N4 ATV 71PU55N4Z, PU75N4Z	100	50	50	20	35	7	14	**VW3 A4 403**	5.800
ATV 71HD11N4 ATV 71WD11N4	100	50	50	20	46	14	13	**VW3 A4 404**	7.000
ATV 71HD15N4 (7), HD18N4 ATV 71WD15N4 (7), WD18N4	300	200	100	100	72	60	14	**VW3 A4 405**	12.000
ATV 71HD22N4 ATV 71WD22N4	300	200	100	100	90	60	11	**VW3 A4 406**	15.000
ATV 71HD30N4, HD37N4 ATV 71WD30N4, WD37N4	300	200	100	100	92	60	30	**VW3 A4 407**	17.000
ATV 71HD45N4…HD75N4 ATV 71WD45N4…WD75N4	300	200	100	100	180	140	58	**VW3 A4 408**	40.000
ATV 71HD90N4…HC13N4	300	150	50	25	273	500	60	**VW3 A4 410**	22.000
ATV 71HC16N4…HC28N4	300	150	50	25	546	500	125	**VW3 A4 411**	25.000
ATV 71HC31...HC40N4	300	150	50	25	728	500	210	**VW3 A4 412**	25.000
ATV 71HC50N4	300	150	50	25	1456	200	380	**VW3 A4 413**	34.000

(1) The filter selection tables give the maximum lengths for shielded cables connecting motors to drives for a switching frequency of 1 to 16 kHz (see page 60281/4). These limits are given as examples only as they vary depending on the stray capacitance of the motors and the cables used. If motors are connected in parallel, it is the sum of the cable lengths that should be taken into account.

(2) Filter nominal current.

(3) Maximum earth leakage current at 230 V and at 400 V 50 Hz on a TT network.

(4) Via thermal dissipation.

(5) See page 60281/2.

(6) LF: low switching frequency. HF: high switching frequency. These frequencies depend on the drive rating:

For drives	Switching frequency	
	LF	HF
	kHz	kHz
ATV 71H●●●M3 ATV 71H075N4…HD11N4 ATV 71W075N4…WD11N4 ATV 71P075N4Z…PU75N4Z	4	4.1…16
ATV 71HD11M3X, HD15M3X ATV 71HD15N4…HD30N4 ATV 71WD15N4…WD30N4	3.5...4	4.1…12
ATV 71HD18M3X...HD45M3X ATV 71HD37N4...HD75N4 ATV 71WD37N4…WD75N4	2…2.5	2.6…12
ATV 71HD55M3X, HD75M3X	2…4	4.1…8
ATV 71HD90N4...HC50N4	2…4	4.1…8

*(7) It is possible to use a special filter **VW3 A4 409** with an leakage current Il (3) of 14 mA which enables a maximum motor cable length of 100 m.*

Presentation: page 60290/2 | Characteristics: page 60290/3 | Dimensions: pages 60294/22 and 60294/23 | Schemes: page 60295/13

Variable speed drives for asynchronous motors

Altivar 71: CEM filters

Option: Input additional filters

IP 30 protection kits

Description	For filters	Reference	Weight kg
Mechanical device consisting of an IP 30 cover and cable clips	VW3 A4 410, 411	**VW3 A9 601**	–
	VW3 A4 412, 413	**VW3 A9 602**	–