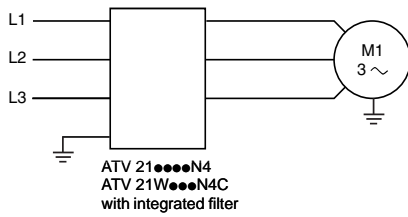


# Variable speed drives for asynchronous motors

## Altivar 21: EMC filters

### Optional integrated filters and additional filters



#### Integrated EMC filters

Altivar 21 drives, except for the ATV 21H...M3X, have built-in radio interference input filters to meet the requirements of the EMC standard for variable speed electrical power drive "products" IEC/EN 61800-3, edition 2, categories C1, C2 or C3 in environment 1 or 2 and to comply with the European directive on EMC (electromagnetic compatibility).

Drives	Maximum length of shielded cable (1) according to		Leakage current (2)
	EN 55011 class A Gr1 (3)	EN 55011 class B Gr1 (3)	
	IEC/EN 61800-3 (3)	IEC/EN 61800-3 (3)	mA
<b>UL Type 1/IP 20 drives</b>			
ATV 21H075N4...HU22N4	20	–	4.5
ATV 21HU30N4...HU55N4	5	–	5.8
ATV 21HU75N4, HD11N4	5	–	2.9
ATV 21HD15N4, HD18N4	5	–	4.8
ATV 21HD22N4, HD30N4	5	–	25.3
ATV 21HD37N4, HD45N4	20	–	21.5
ATV 21HD55N4, HD75N4	100	–	9.1
<b>IP 54 drives</b>			
ATV 21W075N4...WU22N4	5	–	4.5
ATV 21WU30N4...WU55N4	5	–	5.8
ATV 21WU75N4	5	–	2.9
ATV 21WD11N4, WD15N4	5	–	13.3
ATV 21WD18N4	5	–	9.4
ATV 21WD22N4, WD30N4	5	–	25.3
ATV 21WD37N4, WD45N4	20	–	21.5
ATV 21WD55N4, WD75N4	100	–	9.1
ATV 21W075N4C...WU22N4C	–	20	18.4
ATV 21WU30N4C...WU55N4C	–	20	42.8
ATV 21WU75N4C	–	20	37.2
ATV 21WD11N4C, WD15N4C	–	20	81
ATV 21WD18N4C	–	20	77.2
ATV 21WD22N4C, WD30N4C	–	20	84.5
ATV 21WD37N4C, WD45N4C	–	20	53.6
ATV 21WD55N4C, WD75N4C	–	20	56.9

#### Additional EMC input filters

##### Applications

Additional EMC input filters can be used to meet more stringent requirements and are designed to cut down 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 C1, C2 or C3 (see page 60311/2).

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.

##### Use according to the type of line supply

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

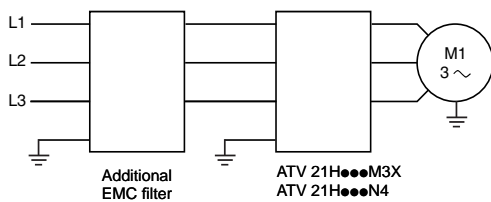
Standard IEC/EN 61800-3, appendix D2.1, states that on IT networks (isolated or impedance earthed neutral), filters can cause permanent insulation monitors to operate in a random manner.

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 switching frequency of 6 to 16 kHz. If motors are connected in parallel, it is the total length that should be taken into account.

(2) Maximum earth leakage current at 480 V 60 Hz on a TT network.

(3) See page 60311/2.



### General characteristics

EMC filter type			VW3 A31 404, 406...409	VW3 A4 406...408
Conformity to standards			EN 133200	
Degree of protection			IP 20 and IP 41 on upper part	
Maximum relative humidity			93% without condensation or dripping water conforming to IEC 68-2-3	
Ambient air temperature around the unit	Operation	°C	-10...+60	-10...+50
	Storage	°C	-25...+70	-40...+65
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 three-phase	V	240 +10% 480 +10%	

### Connection characteristics

Maximum wire size and tightening torque	VW3 A31 404, 406		10 mm <sup>2</sup> (AWG 6) 1.8 Nm
	VW3 A31 407...409		25 mm <sup>2</sup> (AWG 2) 4.5 Nm
	VW3 A4 406, 407		50 mm <sup>2</sup> (AWG 0) 6 Nm
	VW3 A4 408		150 mm <sup>2</sup> (300 kcmil) 25 Nm

### References

For drives	Maximum length of shielded cable (1) according to		In (2)	II (3)	Loss (4)	Reference	Weight
	EN 55011 class A Gr1 (5)	EN 55011 class B Gr1 (5)					
	IEC/EN 61800-3 (5)	IEC/EN 61800-3 (5)					
	m	m	A	mA	W		kg
<b>Three-phase supply voltage: 200...240 V 50/60 Hz</b>							
ATV 21H075M3X	20	20	15	6.7	0.47	VW3 A31 404	1.000
ATV 21HU15M3X	20	20	15	6.7	1.6	VW3 A31 404	1.000
ATV 21HU22M3X	20	20	15	6.7	3.3	VW3 A31 404	1.000
ATV 21HU30M3X	20	20	25	17.8	3.6	VW3 A31 406	1.650
ATV 21HU40M3X	20	20	25	17.8	6.2	VW3 A31 406	1.650
ATV 21HU55M3X	20	–	47	20.6	3.7	VW3 A31 407	3.150
ATV 21HU75M3X	20	–	47	20.6	6.8	VW3 A31 407	3.150
ATV 21HD11M3X	20	–	83	14.5	9.1	VW3 A31 408	5.300
ATV 21HD15M3X	20	–	83	14.5	16	VW3 A31 408	5.300
ATV 21HD18M3X	20	–	83	14.5	23.1	VW3 A31 408	5.300
ATV 21HD22M3X	100	–	90	40.6	27.1	VW3 A4 406	15.000
ATV 21HD30M3X	20	–	180	86.3	23.1	VW3 A4 408	40.000
<b>Three-phase supply voltage: 380...480 V 50/60 Hz</b>							
ATV 21H075N4	20	20	15	13.8	0.13	VW3 A31 404	1.000
ATV 21HU15N4	20	20	15	13.8	0.45	VW3 A31 404	1.000
ATV 21HU22N4	20	20	25	13.8	0.9	VW3 A31 404	1.000
ATV 21HU30N4	20	20	25	37	1	VW3 A31 406	1.650
ATV 21HU40N4	20	20	25	37	1.6	VW3 A31 406	1.650
ATV 21HU55N4	20	20	25	37	3	VW3 A31 406	1.650
ATV 21HU75N4	20	20	47	42.8	1.9	VW3 A31 407	3.150
ATV 21HD11N4	20	20	47	42.8	3.9	VW3 A31 407	3.150
ATV 21HD15N4	20	20	49	42.8	9.2	VW3 A31 409	4.750
ATV 21HD18N4	20	20	49	42.8	13.8	VW3 A31 409	4.750
ATV 21HD22N4	100	–	90	84.5	7.3	VW3 A4 406	15.000
ATV 21HD30N4	100	–	90	84.5	13.5	VW3 A4 406	15.000
ATV 21HD37N4	100	100	92	106	16	VW3 A4 407	17.000
ATV 21HD45N4	100	100	92	106	23	VW3 A4 407	17.000
ATV 21HD55N4	100	100	180	193	18	VW3 A4 408	40.000
ATV 21HD75N4	100	100	180	193	34	VW3 A4 408	40.000



VW3 A31 406

(1) The filter selection tables give the maximum lengths for shielded cables connecting motors to drives for a switching frequency of 6 to 16 kHz. 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 total length that should be taken into account.

(2) Filter nominal current.

(3) Maximum earth leakage current at 230 V and at 480 V 60 Hz on a TT network.

(4) Via thermal dissipation.

(5) See page 60311/2.