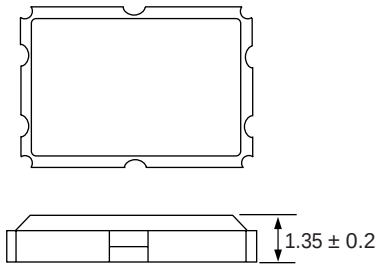
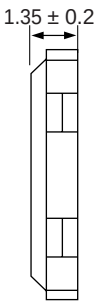
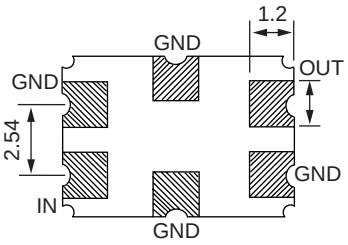
HE-SMF-7 SURFACE MOUNT MONOLITHIC CRYSTAL FILTER

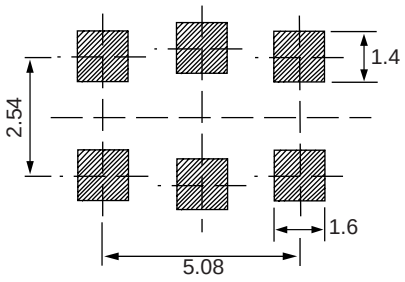
MODEL	NOM. FREQ. MHz	PASS BAND		STOP BAND		TERMINATING IMPEDANCE kΩ // pF
		dB	kHz	dB	kHz	
21K9.0A1	21.700	3	± 4.5	14	± 12.5	1.5 K Ω // 4.0 pF
21K15A	21.400	3	± 7.5	18	± 25.0	1.5 K Ω // 2.0 pF
26K15A	26.050	3	± 7.5	18	± 25.0	1.5 K Ω // 2.0 pF
29K20A	29.250	3	± 10.0	10	± 25.0	1.8 K Ω // 1.5 pF
45K15A	45.000	3	± 7.5	15	± 25.0	0.65K Ω // 5.0 pF
45K30A	45.000	3	± 15.0	15	± 50.0	1.2K Ω // 1.5 pF
45K32A	45.000	2	± 16.0	15	± 60.0	1.1K Ω // -0.93 pF





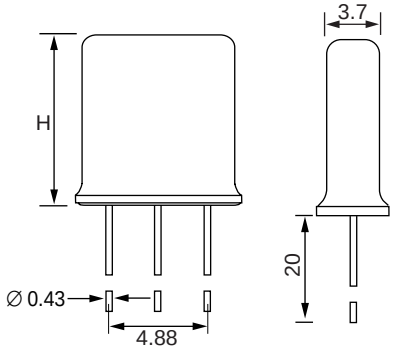


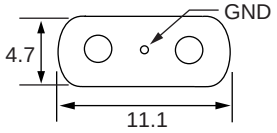
Recommended Solder Pad Layout



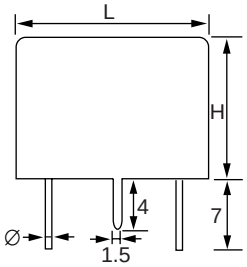
MCF FOR GENERAL USES

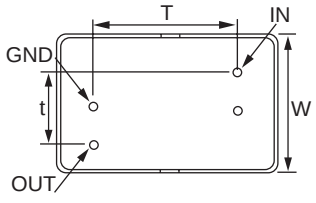
FOR ELECTRICAL SPECIFICATIONS PLEASE SEE NEXT PAGE (P. 60)





CASE	H
49/M	11.2
49/M2	9.5





CASE	L	W	H	T	t	∅
C1	15	12	15	9	5	0.43
D1	18.5	12	15	13.4	5	0.43
E1	23	12	15	17.8	5	0.43
D2	11	8.5	11.5	7.4	4	0.3
E2	13.5	8.5	11.5	9.8	4	0.3

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HEC MONOLITHIC CRYSTAL FILTER FOR GENERAL USES

hec, inc.

12.5 KHz CHANNEL SPACING

MODEL	NOMINAL FREQUENCY (MHz)	No. of Poles	3dB Bandwidth (KHz)	Ripple (dB)	Insertion Loss (dB)	StopBand Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance K Ω /pF	Case
10G7.5A	10.700	2	±3.75	0.5	1.5	±18/20	35/+300~1000 50/-200~1000	1.8 // 5	49 / M
10G7.5B		4		1.0	2.5	±14/40	65/+300~1000 80/-200~1000	1.8 // 4	49 / MX2
10G7.5C		6		2.0	3.5	±12.5/65	65/±12.5~±300	1.8 // 3.5	C - 1
10G7.5D		8			4.0	±12.5/90	90/±12.5~±300		D - 1
21M7.5A	21.400 21.500 21.600 21.700	2		0.5	2.0	±18/20	35/±350~1000 50/-200~1000	0.85 // 6	UM1 - 3
21M7.5B		4		1.0	2.5	±14/40	65/+350~1000 80/-200~1000	0.85 // 5	UM1 - 3X2
21M7.5C		6		2.0	3.0	±12.5/65	65/±12.5~±300		D - 2
21M7.5D		8			4.0	±12.5/65	90/±12.5~±300		
21M7.5E		10			4.5	±10.5/90	90/±12.5~±300		E - 2

20 KHz CHANNEL SPACING

MODEL	NOMINAL FREQUENCY (MHz)	No. of Poles	3dB Bandwidth (KHz)	Ripple (dB)	Insertion Loss (dB)	StopBand Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance K Ω /pF	Case
10G12A	10.700	2	±6.0	0.5	2.0	±23/18	35/+300~1000 40/-200~1000	2.5 // 2.5	49 / M
10G12B		4		1.0	2.5	±20/40	65/+300~1000 80/-200~1000	2.5 // 1.5	49 / MX2
10G12C		6		2.0	3.0	±20/60	65/±20~±300	2.8 // 1	C - 1
10G12D		8			4.0	±20/90	90/±20~±300		D - 1
21M12A	21.400 21.600 21.800	2		0.5	2.0	±23/18	35/±350~1000 50/-200~1000	1.2 // 3	UM1 - 3
21M12B		4		1.0	2.5	±20/40	65/+350~1000 70/-200~1000	1.2 // 2.5	UM1 - 3X2
21M12C		6		2.0	3.0	±20/65	65/±20~±300		D - 2
21M12D		8			4.0	±20/90	90/±20~±300		

25 KHz CHANNEL SPACING

MODEL	NOMINAL FREQUENCY (MHz)	No. of Poles	3dB Bandwidth (KHz)	Ripple (dB)	Insertion Loss (dB)	StopBand Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance K Ω /pF	Case
10G15A	10.700	2	±7.5	0.5	2.0	±25/18	35/+300~1000 40/-200~1000	3 // 2	49 / M
10G15B		4		1.0	2.5	±25/40	55/+300~1000 80/-200~1000		49 / MX2
10G15C		6		2.0	3.0	±25/65	65/±25~±300	3 // 1.5	C - 1
10G15D		8			4.0	±20/90	90/±25~±300		D - 1
10G15E		10			4.5	±25/90	90/±20~±300		E - 1
21M15A	21.400	2		0.5	1.5	±25/18	35/±350~1000 50/-200~1000	1.5 // 3	UM1 - 3
21M15B		4		1.0	2.0	±25/40	65/+350~1000 80/-200~1000	1.5 // 3 1.5 // 2	UM1 - 3X2
21M15C		6		2.0	2.5	±25/65	65/±25~±300		D - 2
21M15D		8			3.0	±25/90	90/±25~±300		
21M15E		10			4.0	±20/90	90/±20~±300		E - 2

50 KHz CHANNEL SPACING

MODEL	NOMINAL FREQUENCY (MHz)	No. of Poles	3dB Bandwidth (KHz)	Ripple (dB)	Insertion Loss (dB)	StopBand Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance K Ω /pF	Case
10G30A	10.700	2	±15	0.5	1.5	±50/15	35/+300~+1000 40/-300~-1000	5 // 0	49 / M
10G30B		4		1.0	2.5	±40/30	30/±40~±300		49 / MX2
10G30C		6		2.0	3.0	±45/60	60/±45~±300	5.5 // -1	C - 1
10G30D		8			3.5	±50/90	90/±50~±300		D - 1
21M30A	21.400 21.600 21.800	2		0.5	1.5	±45/15	35/±350~+1000 45/-300~-1000	1.5 // 1	UM1 - 3
21M30B		4		1.0	2.0	±50/40	65/+350~+1000 80/-250~-1000	1.8 // 0.5	UM1 - 3X2
21M30C		6		2.0	2.5	±50/65	65/±50~±300	2.2 // 0.5	D - 2
21M30D		8			3.5	±50/90	90/±50~±1000		

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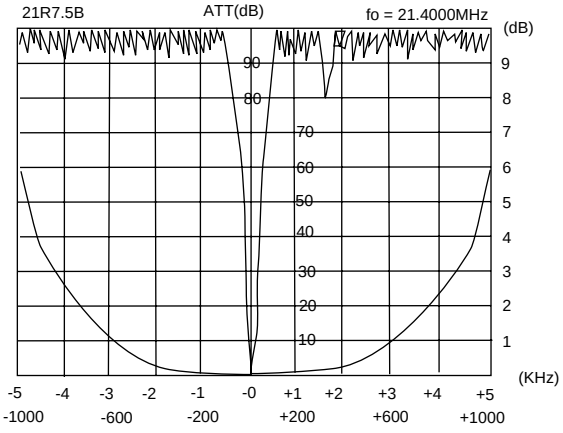
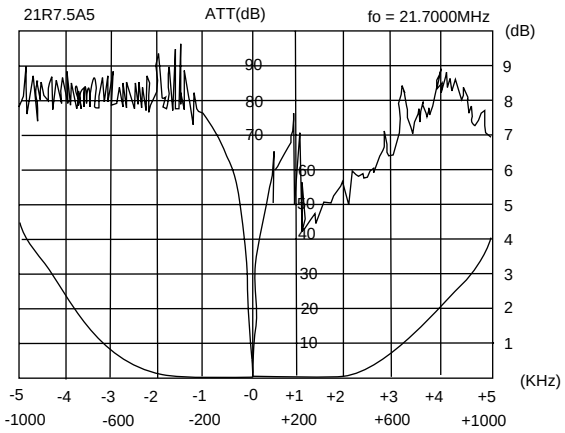
HEC MONOLITHIC CRYSTAL FILTER FOR CORDLESS PHONES

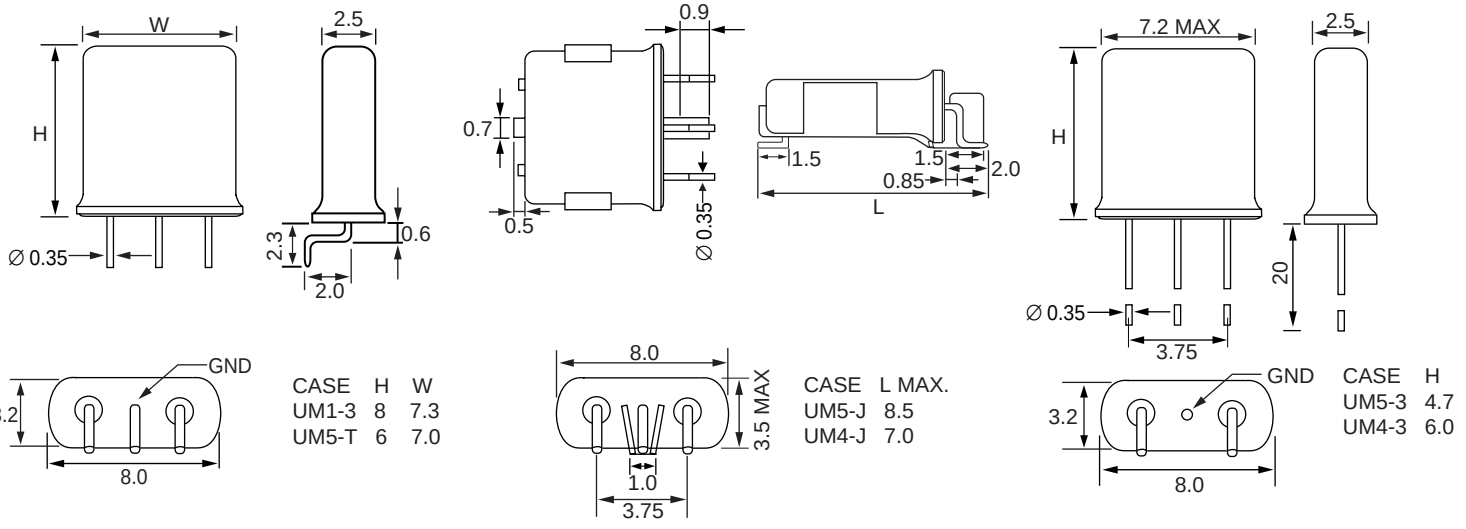
ELECTRICAL SPECIFICATIONS

MODEL	NOMINAL FREQUENCY (MHz)	No. of Poles	3dB Bandwidth (KHz)	Ripple (dB)	Insertion Loss (dB)	StopBand Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance	Case
21M7.5A5	21.400 21.500 21.600 21.700	2	±3.75	0.5	2.0	±12.5/18	75 / -910	1.5 // 6	UM1 - 3
21M7.5A9									UM1 - T
21R7.5A9									UM5 - J
21S7.5A5									UM4 - 3
21M7.5B		4		1.0	2.5	±12.5/35	90 / ±910	0.85 // 5	UM1 - 3x2
21R7.5B									UM5 - 3x2
21S7.5B									UM4 - 3x2
21R15A		2	±7.5	0.5	2.0	±25/18	75 / -910	1.5 // 3	UM5 - 3
21S15A1					2.0	±25/18	75 / -910	1.5 // 2	UM4 - 3
21R15B		4		1.0	2.5	±25/40	90 / ±910	1.5 // 2	UM5 - 3x2
26M8.0A2	26.050	2	±4	1.0	1.5	±12.5/18	75 / -910	0.8 // 10.8	UM1 - 3
26R15A5			±7.5	0.5	2.0	±25/18		1.5 // 4	UM5 - 3
26R15B5		4		1.0	2.5	±25/40	90 / ±910	1.5 // 2.5	UM5 - 3x2
26M17B9			±8.5		3.0	±25/30	80 / ±910	1.1 // 2	UM1 - Tx2

MECHANICAL DRAWING







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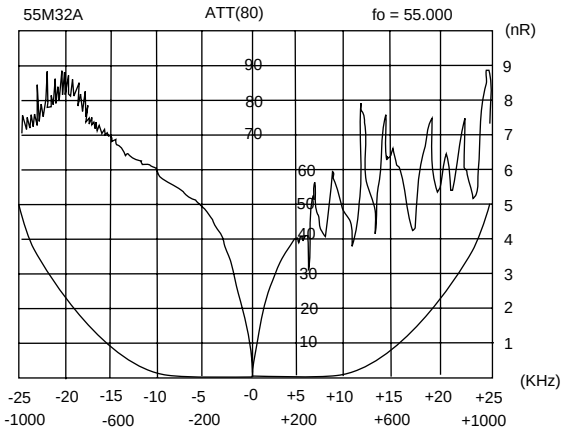
HEC MONOLITHIC CRYSTAL FILTER FOR CELLULAR PHONES

ELECTRICAL SPECIFICATIONS

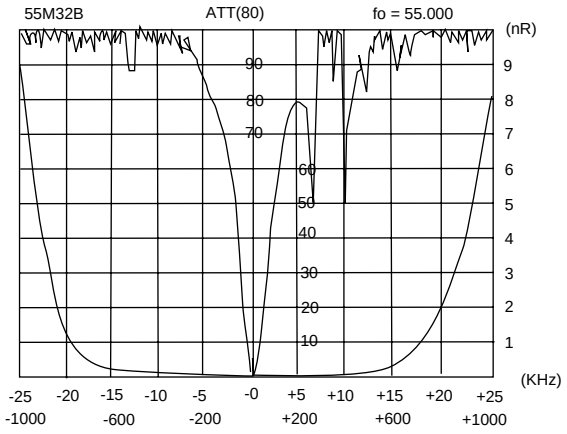
MODEL	NOMINAL FREQUENCY (MHz)	No. of Poles	3dB Bandwidth (KHz)	Ripple (dB)	Insertion Loss (dB)	StopBand Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance	Case
45M15A	45.000	2	±7.5	1.0	2.0	±25/15	70 / -910	1.5 // 6	UM1 - 3
45M15A9									UM1 - T
45R15A									UM5 - 3
45S15A									UM4 - 3
45M15B		4			3.0	±25/30	90 / ±910	0.85 // 5	UM1 - 3x2
45R15B									UM5 - 3x2
45S15B									UM4 - 3x2
45M32A		2	±16.0	0.5	2.5	±60/15	65 / -910	1.5 // 3	UM1 - 3
45M32B		4		1.0	4.0	±50/35	80 / ±910	1.5 // 2	UM1 - 3x2
55M32A	55.000	2		0.5	2.5	±29.5/4	65 / -910	1.5 // 2	UM1 - 3
55M32B		4		1.0	5.0	±52/30	80 / ±910	0.8 // 10.8	UM1 - 3x2
55M30A		2	±15		2.0	±50/15	70 / -910	1.5 // 4	UM1 - 3
55M30B		4			3.0	±50/30	90 / ±910	1.5 // 2.5	UM1 - 3x2
120M30A	120.000	2	±15	1.0	3.0	±60/15	40 / ±910	1.1 // 2	UM1 - 3

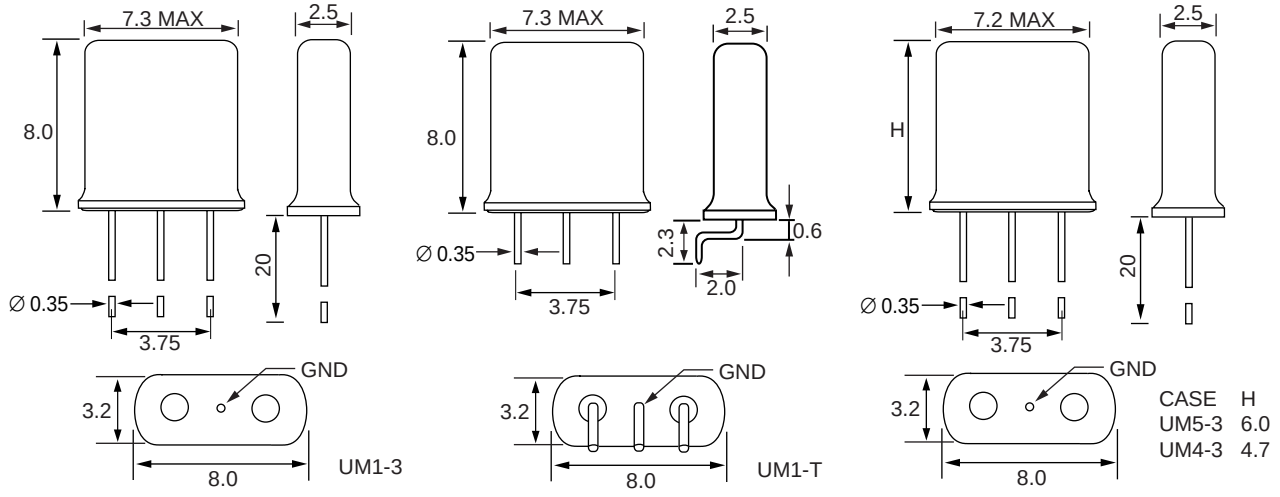
MECHANICAL DRAWING

55M32A



55M32B





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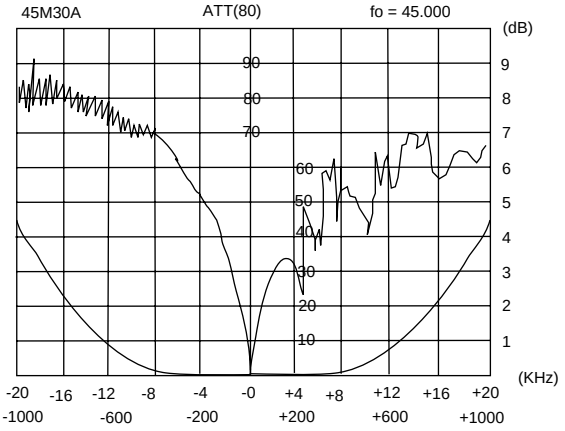
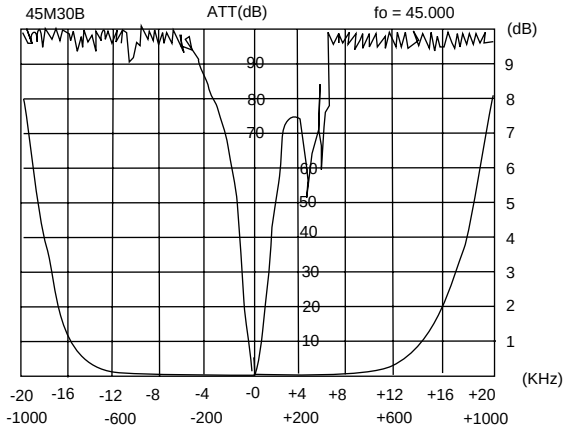
HEC MONOLITHIC CRYSTAL FILTER FOR UHF MOBILE RADIOS

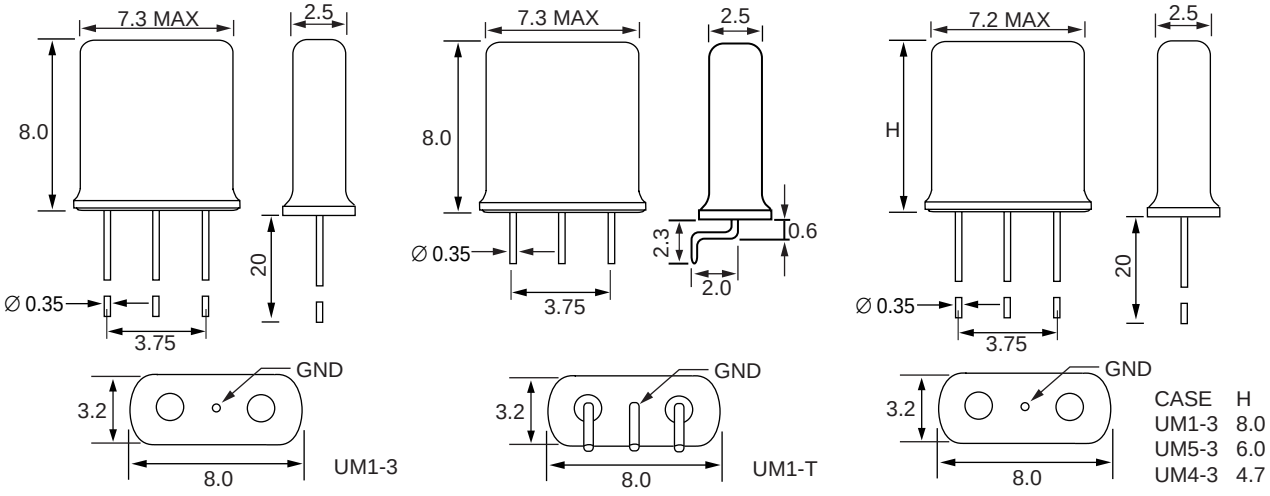
ELECTRICAL SPECIFICATIONS

MODEL	NOMINAL FREQUENCY (MHz)	No. of Poles	3dB Bandwidth (KHz)	Ripple (dB)	Insertion Loss (dB)	StopBand Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance	Case
45M7.5A	45.000	2	±3.75	1.0	2.0	±12.5/10	65 / -910	0.35 // 10.5	UM1 - 3
45M7.5B		4			4.0	±12.5/30	90 / ±910	0.35 // 6.5	UM1 - 3X2
45M20A		2	±10.0	0.5	2.0	±30/15	65 / -910	0.91 // 2.5	UM1 - 3
45M20B		4		1.0	3.0	±40/35	90 / ±910		UM1 - 3X2
45M30A		2	±15.0		2.0	±50/15	70 / -910	1.2 // 1.5	UM1 - 3
45M30B		4			3.0	±50/35	90 / ±910	1.2 // 0.7	UM1 - 3X2
45S30B		4			3.0	±50/35	70 / ±910	0.8 // 1.2	UM4 - 3X2
55M30A	55.000	2			2.0	±50/15	70 / -910	1.2 // 1.5	UM1 - 3
55M30B		4			3.0	±50/30	90 / ±910	1.2 // 0.7	UM1 - 3X2
90M20A	90.000	2	±10.0		2.5	±30/15	35 / -910	2.5 // -1.0	UM1 - 3
90M20B		4			4.0	±30/30	70 / ±910		UM1 - 3X2

MECHANICAL DRAWING







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