Fristam Powder Mixer

The Fristam Powder Mixer is used to dissolve or suspend powdery or liquid ingredients (e.g. sugar, milk powder, cocoa powder, thickeners, oils and liquid flavourings etc.) in a receiver tank.

Function Principle

The powder mixer consists of two main components:

1. A self-priming centrifugal pump from the Fristam FZ range.
2. The Fristam shear pump from the FSPE 35 range which acts as an inline rotary homogenizer.

The self-priming centrifugal pump draws the basic fluid out of the receiver tank and transfers through a short pipe into the shear pump. When the self-priming centrifugal pump is throttled on the suction side by a butterfly valve, a strong vacuum (up to approx. 0.5 bar) is generated between the pump and the butterfly valve. The feed hopper is located at this point for product intake.

The vacuum draws in the powder or liquid directly into the fluid flow. This un-homogenised mixture is first transferred to the self-priming centrifugal pump where the initial mixing takes place. The premix is then pumped to the shear pump where any remaining lumps are completely eliminated by high turbulence action at peripheral speeds of up to 30 m/s.

SIZES

	Powder Mixer *				Approx. Dimensions	Standard Connection	Approx. Weight
	Self-priming Centrifugal Pump	Power Con-sumption (kW)	Shear Pump	Power Con-sumption (kW)	Width Height Depth (mm)	DIN 11851 Inlet Outlet	(kg)
PM01	FZ 15 PM	2.0 - 4.0	FSPE 712 D	3.0 - 5.5	800 990 1200	DN40 DN40	250
PM02	FZ 17 PM	4.0 - 5.5	FSPE 3522 D	4.0 - 11.0	800 990 1700	DN50 DN50	300
PM03	FZ 20 PM	5.5 - 11.0	FSPE 3532 D	7.5 - 18.5	800 990 1700	DN50 DN50	350
PM04	FZ 22 PM	11.0 - 15.0	FSPE 3542 D	15.0 - 30.0	1050 1000 2010	DN65 DN65	450
PM05	FZ 25 PM	15.0 - 18.5	FSPE 3552 D	22.0 - 45.0	1050 1000 2010	DN80 DN80	620

*) Other combinations possible depending on the application

EQUIPMENT OPTIONS

Powder mixer: Fixed unit on height-adjustable machine feet or mobile unit on 4 rollers (2 fixed, 2 swivelling)

Control cabinet: With/without control cabinet, stainless steel, enclosure IP55/IP65..
Current consumption up to 63 A, optionally with/without cabling

Hopper: With 500 mm diameter, H = 470 mm, approx. 35 l capacity
With 700 mm diameter, H = 470 mm, approx. 66 l capacity

With/without vibration motor 400 V~, 45 W
With/without filter screen

Piping: Stainless steel 1.4404, 1.4571,...

Connections: Thread: DIN 11851, DIN 11864, RJT, SMS,..

Flanges: DIN, ANSI,...
Clamps: Tri-clamp, ISO-clamp,..

Pumps: With/without shroud

Seals: Mechanical seal, single/double flushed
Elastomer: VMQ, NBR, FKM, PTFE/KALREZ, FEP...

Drives: PTC-resistor, separate fan, frequency converter, explosion-proof

Stand: 04.04.2007

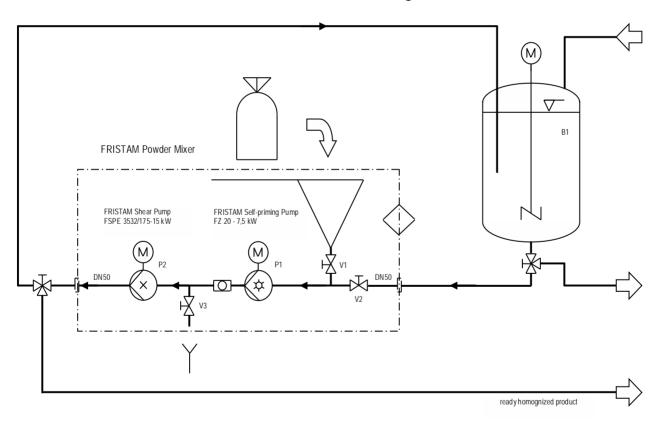# CONNECTION OF THE POWDER MIXER TO A RECEIVER TANK

HYDRAULIC CONNECTION

The hydraulic connection will be installed according to machine size; project specifications, customer requirements etc. (see order confirmation).

Suction side:

We recommend that a feed/break tank is used to allow the liquid to free flow into the powder mixing system to avoid excessive inlet pressures. The hydrostatic pressure should be between approx. 0.05 – 0.5 bar (0.5 – 5.0 m static height). Uncontrolled pumps should not be used to feed the suction of the powder mixer, as this will disrupt the suction capability of the system and could force liquid up into the funnel.

Discharge side:

Back pressure from the discharge side of the powder mixer back to the feed tank must be kept as low as possible. For this reason the pipe I.D. has to be as large as possible and the length of the return pipe as short as possible. It is very important to minimize the amount of valves, fittings, strainers and other restrictions in the pipe to limit the back pressure. Equipment such as heat exchangers should be strictly avoided unless an alternative solution has been agreed.

ELECTRICAL CONNECTION OF POWDER MIXER:

Electrical connection: 1 x 400 V, 32 A or 63 A, CEE-plug acc.to DIN 49 462/63, depends on the execution.
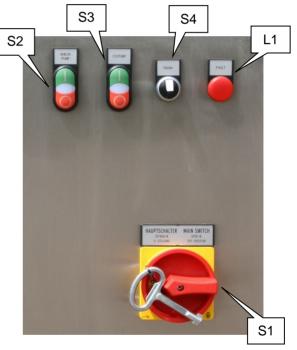
Interpoles are only approved for 32 A CEE-plugs.

In general a plug-in connection is used – a plug socket with switch and 63A fuse is required.

The motors are poled at the connection to the control cabinet so that they will rotate correctly with a right-handed phase sequence.

The VDE (or locally recognised) regulations must always be observed.

CONTROL SWITCHES:

S1 Main switch (ON/OFF)

S2 Switch FZ/PUMP (ON/OFF)
Start/Stop of FZ pump. The switch will light up during Operation.

S3 Switch Shearpump (ON/OFF)
Start/Stop of FSPE pump. The switch will light up during Operation.

S4 Switch Vibrator (ON/OFF) Vibrator drive on the funnel. On activation the Vibrator runs in a defined, (adjustable) cycle time (i.e. 8 s on/8 s off)

L1 Light „FAULT"
Indicates fault condition

PERFORMANCE DATA

Powder Mixer		Selfpriming pump		Rotary Homogenisator, "Shearpump"		crystal sugar			thickener (i.e. arabic gum, pectin, depending on product concentration!)		
			Power		Power	max. powder incorporation rate, w. funnel product: sugar*	piping diam. recommended	Funnel outlet diam. recommended	max. powder incorporation rate w. funnel *	Piping diam. recommended	Funnel outlet diam. recommended
el. operation			1450 rpm, 50 Hz		2950 rpm 50 Hz						
Type	Pump combination	Type **	kW	Type **	kW	kg/h	mm	mm	kg/h	mm	mm
PM01	FZ 15 PM + FSPE 712 D	FZ 15 PM	3,0 - 4,0	FSPE 712 D	3,0 - 5,5*	500	40	50	100 - 200	40	40
PM02	FZ 17 PM + FSPE 3522 D	FZ 17 PM	5,5 - 7,5	FSPE 3522 D	7,5 - 11,0*	1800	50	65	300 - 500	50	50
PM03	FZ 20 PM + FSPE 3532 D	FZ 20 PM	7,5 - 11,0	FSPE 3532 D	11,0 - 22,0*	3500	50 - 65	65	600 - 1200	50 - 65	50
PM04	FZ 22 PM + FSPE 3542 D	FZ 22 PM	11,0 - 15,0	FSPE 3542 D	22,0 - 37,0*	5000	65 - 80	80	1200 - 2000	65 - 80	65
PM05	FZ 25 PM + FSPE 3552 D	FZ 25 PM	15,0 - 18,5	FSPE 3552 D	37,0 - 45,0*	10000	100 - 125	100	1500 - 3000	100 - 125	100

*) : dependening on concentration and end viscosity

**): depending on application, variing pump model and power is possible

Note: The viscosity in the feeding process is much higher than the end viscosity of the product (partially over concentration in the tube after the funnel).
Sugar can require a higher motor powder (additional friction causes by sugar crystals).