Use following tables to configurate your personal system:

1. number of cylinders: How many cylinders/lifting elements do you need for your application? (1 – 10)

2. Stroke length: How much stroke length do you need?

NOTE

Cylinders CX and linear units LX:	max. 700 mm *(27.5")*
Table legs TT, TQ, TL, TM:	max. 400 mm *(16")*
Table legs TA, TU:	max. 500 mm *(20")*

3. Max. system load: How much weight do you need to lift?
(350 / 600 / 800 kg) *(772 / 1323 / 1764 lbs)*

NOTE
- Weight of table plate/frame must be included into calculation
- Avoid uneven load distribution
- Note max. load per cylinder
  - 14xx: max. 1'500 N
  - 18xx: max. 2'500 N
- No high impact loads allowed (pressure peak)
- No pulling forces allowed (cylinders have no pull protection)
- Consider max. allowed side forces and bending moments

4. Cylinder type: The table shows the correct cylinder, fitting your configuration.
   - For more information please check the data sheets and drawings

5. Pump type: The table shows the correct pump, fitting your configuration.
   - For more information please check the data sheets and drawings

6. Lifting speed: The table shows the lifting speed with hand crank or motor drive.

7. Motor type: Model 110 or 230 VAC

NOTE loss of stroke length

The control box automatically offsets the upper and lower end position by one motor turn, so that the system won't drive through the block position within a loss of signal.

Depending on the system combination (hydraulic translation), the system stops its movement a few milimeters before the defined end position. (loss of stroke length = 2 x translation)

   - More information see operating instruction.

8. Retraction force: Ergoswiss hydraulic systems are single-acting systems.
While retracting the system, it is always necessary to have an external retracting force to press the oil from the cylinders back into the pump.
The formula to calculate the minimum necessary retracting force is shown on the last page of this document.

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
1	100 *(220)*	150 *(5″)*	① 1415	PA 1815	5 mm/U *(0.2″/T)*	PAD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PA 1820			
		300 *(12″)*	① 1430	PA 1830			
		400 *(16″)*	① 1440	PA 1840			
		500 *(19.5″)*	① 1450	PA 1850			
		600 *(23.5″)*	① 1460	PA 1860			
		700 *(27.5″)*	① 1470	PA 1870			

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
2	300 *(661)*	150 *(5″)*	① 1415	PA 2815	5 mm/U *(0.2″/T)*	PAD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PA 2820			
		300 *(12″)*	① 1430	PA 2830			
		400 *(16″)*	① 1440	PA 2840			
		500 *(19.5″)*	① 1450	PA 2850			
		600 *(23.5″)*	① 1460	PA 2860			
		700 *(27.5″)*	① 1470	PA 2870			
	500 *(1102)*	90 *(3.5″)*	① 1815	PA 2815	3 mm/U *(0.12″/T)*	PAD ② -6 mm stroke *(-0.25″ stroke)*	9 mm/s *(0.35″/s)*
		110 *(4.5″)*	① 1815	PA 2820			
		180 *(7″)*	① 1820	PA 2830			
		240 *(9.5″)*	① 1830	PA 2840			
		300 *(12″)*	① 1830	PA 2850			
		400 *(16″)*	① 1840	PA 2866			

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
3	350 *(772)*	150 *(5″)*	① 1415	PF 3815	5 mm/U *(0.2″/T)*	PFD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PF 3820			
		300 *(12″)*	① 1430	PF 3830			
		400 *(16″)*	① 1440	PF 3840			
		500 *(19.5″)*	① 1450	PF 3850			
		600 *(23.5″)*	① 1460	PF 3860			
		700 *(27.5″)*	① 1470	PF 3870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PF 3820	3 mm/U *(0.12″/T)*	PFD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PF 3830			
		240 *(9.5″)*	① 1830	PF 3840			
		300 *(12″)*	① 1830	PF 3850			
		400 *(16″)*	① 1840	PF 3866			

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
4	350 *(772)*	150 *(5″)*	① 1415	PF 4815	5 mm/U *(0.2″/T)*	PFD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PF 4820			
		300 *(12″)*	① 1430	PF 4830			
		400 *(16″)*	① 1440	PF 4840			
		500 *(19.5″)*	① 1450	PF 4850			
		600 *(23.5″)*	① 1460	PF 4860			
		700 *(27.5″)*	① 1470	PF 4870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PF 4820	3 mm/U *(0.12″/T)*	PFD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PF 4830			
		240 *(9.5″)*	① 1830	PF 4840			
		300 *(12″)*	① 1830	PF 4850			
		400 *(16″)*	① 1840	PF 4866			
	800 *(1764)*	110 *(4.5″)*	① 1815	PF 4418	1.8 mm/U *(0.07″/T)*	PFD ② -5 mm stroke *(-0.2′ stroke)*	5 mm/s *(0.2″/s)*
		180 *(7″)*	① 1820	PF 4430			
		240 *(9.5″)*	① 1830	PF 4440			

①: Cylinder, linear unit or table leg (CB, CD, CE, ..., LA, LD, ..., TA, TT, ...)
②: Motor voltage (230, 110 VAC)

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
5	350 *(772)*	150 *(5″)*	① 1415	PB 5815	5 mm/U *(0.2″/T)*	PBD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PB 5820			
		300 *(12″)*	① 1430	PB 5830			
		400 *(16″)*	① 1440	PB 5840			
		500 *(19.5″)*	① 1450	PB 5850			
		600 *(23.5″)*	① 1460	PB 5860			
		700 *(27.5″)*	① 1470	PB 5870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PB 5820	3 mm/U *(0.12″/T)*	PBD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PB 5830			
		240 *(9.5″)*	① 1830	PB 5840			
		300 *(12″)*	① 1830	PB 5850			
		400 *(16″)*	① 1840	PB 5866			
	800 *(1764)*	110 *(4.5″)*	① 1815	PB 5418	1.8 mm/U *(0.07″/T)*	PBD ② -5 mm stroke *(-0.2′ stroke)*	5 mm/s *(0.2″/s)*
		180 *(7″)*	① 1820	PB 5430			
		240 *(9.5″)*	① 1830	PB 5440			

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
6	350 *(772)*	150 *(5″)*	① 1415	PB 6815	5 mm/U *(0.2″/T)*	PBD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PB 6820			
		300 *(12″)*	① 1430	PB 6830			
		400 *(16″)*	① 1440	PB 6840			
		500 *(19.5″)*	① 1450	PB 6850			
		600 *(23.5″)*	① 1460	PB 6860			
		700 *(27.5″)*	① 1470	PB 6870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PB 6820	3 mm/U *(0.12″/T)*	PBD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PB 6830			
		240 *(9.5″)*	① 1830	PB 6840			
		300 *(12″)*	① 1830	PB 6850			
		400 *(16″)*	① 1840	PB 6866			
	800 *(1764)*	110 *(4.5″)*	① 1815	PB 6418	1.8 mm/U *(0.07″/T)*	PBD ② -5 mm stroke *(-0.2′ stroke)*	5 mm/s *(0.2″/s)*
		180 *(7″)*	① 1820	PB 6430			
		240 *(9.5″)*	① 1830	PB 6440			

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
7	350 *(772)*	150 *(5″)*	① 1415	PB 7815	5 mm/U *(0.2″/T)*	PBD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PB 7820			
		300 *(12″)*	① 1430	PB 7830			
		400 *(16″)*	① 1440	PB 7840			
		500 *(19.5″)*	① 1450	PB 7850			
		600 *(23.5″)*	① 1460	PB 7860			
		700 *(27.5″)*	① 1470	PB 7870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PB 7820	3 mm/U *(0.12″/T)*	PBD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PB 7830			
		240 *(9.5″)*	① 1830	PB 7840			
		300 *(12″)*	① 1830	PB 7850			
		400 *(16″)*	① 1840	PB 7866			
	800 *(1764)*	110 *(4.5″)*	① 1815	PB 7418	1.8 mm/U *(0.07″/T)*	PBD ② -5 mm stroke *(-0.2′ stroke)*	5 mm/s *(0.2″/s)*
		180 *(7″)*	① 1820	PB 7430			
		240 *(9.5″)*	① 1830	PB 7440			

①: Cylinder, linear unit or table leg (CB, CD, CE, ..., LA, LD, ..., TA, TT, ...)
②: Motor voltage (230, 110 VAC)

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
8	350 *(772)*	150 *(5″)*	① 1415	PB 8815	5 mm/U *(0.2″/T)*	PBD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PB 8820			
		300 *(12″)*	① 1430	PB 8830			
		400 *(16″)*	① 1440	PB 8840			
		500 *(19.5″)*	① 1450	PB 8850			
		600 *(23.5″)*	① 1460	PB 8860			
		700 *(27.5″)*	① 1470	PB 8870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PB 8820	3 mm/U *(0.12″/T)*	PBD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PB 8830			
		240 *(9.5″)*	① 1830	PB 8840			
		300 *(12″)*	① 1830	PB 8850			
		400 *(16″)*	① 1840	PB 8866			
	800 *(1764)*	110 *(4.5″)*	① 1815	PB 8418	1.8 mm/U *(0.07″/T)*	PBD ② -5 mm stroke *(-0.2′ stroke)*	5 mm/s *(0.2″/s)*
		180 *(7″)*	① 1820	PB 8430			
		240 *(9.5″)*	① 1830	PB 8440			

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
9	350 *(772)*	150 *(5″)*	① 1415	PB 9815	5 mm/U *(0.2″/T)*	PBD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PB 9820			
		300 *(12″)*	① 1430	PB 9830			
		400 *(16″)*	① 1440	PB 9840			
		500 *(19.5″)*	① 1450	PB 9850			
		600 *(23.5″)*	① 1460	PB 9860			
		700 *(27.5″)*	① 1470	PB 9870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PB 9820	3 mm/U *(0.12″/T)*	PBD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PB 9830			
		240 *(9.5″)*	① 1830	PB 9840			
		300 *(12″)*	① 1830	PB 9850			
		400 *(16″)*	① 1840	PB 9866			
	800 *(1764)*	110 *(4.5″)*	① 1815	PB 9418	1.8 mm/U *(0.07″/T)*	PBD ② -5 mm stroke *(-0.2′ stroke)*	5 mm/s *(0.2″/s)*
		180 *(7″)*	① 1820	PB 9430			
		240 *(9.5″)*	① 1830	PB 9440			

# Cyl	Max. system load [kg] *(lbs)*	Stroke length [mm] *(in)*	Cylinder type	Pump type	Stroke per turn	Motor type	Motor speed
10	350 *(772)*	150 *(5″)*	① 1415	PB 0815	5 mm/U *(0.2″/T)*	PBD ② -10 mm stroke *(-0.4″ stroke)*	15 mm/s *(0.6″/s)*
		200 *(8″)*	① 1420	PB 0820			
		300 *(12″)*	① 1430	PB 0830			
		400 *(16″)*	① 1440	PB 0840			
		500 *(19.5″)*	① 1450	PB 0850			
		600 *(23.5″)*	① 1460	PB 0860			
		700 *(27.5″)*	① 1470	PB 0870			
	600 *(1323)*	110 *(4.5″)*	① 1815	PB 0820	3 mm/U *(0.12″/T)*	PBD ② -6 mm stroke *(-0.25′ stroke)*	9 mm/s *(0.35″/s)*
		180 *(7″)*	① 1820	PB 0830			
		240 *(9.5″)*	① 1830	PB 0840			
		300 *(12″)*	① 1830	PB 0850			
		400 *(16″)*	① 1840	PB 0866			
	800 *(1764)*	110 *(4.5″)*	① 1815	PB 0418	1.8 mm/U *(0.07″/T)*	PBD ② -5 mm stroke *(-0.2′ stroke)*	5 mm/s *(0.2″/s)*
		180 *(7″)*	① 1820	PB 0430			
		240 *(9.5″)*	① 1830	PB 0440			

①: Cylinder, linear unit or table leg (CB, CD, CE, ..., LA, LD, ..., TA, TT, ...)
②: Motor voltage (230, 110 VAC)

Retracting force:

The more cylinders and the longer the tubing, the more weight is needed to press the oil from the cylinders back into the pump. With the formula below it is possible to calculate the minimal necessary force to retract the system with cylinders type 14xx or 18xx.

Cylinder type	Minimal necessary retracting force **per cylinder**
Cx 14xx	3.5kg + (3.0kg x length of tubing in meter) *max. allowed length of tubing 10m*
Cx 18xx	3.5kg + (4.5kg x length of tubing in meter) *max. allowed length of tubing 10m*

Guide	Additional retracting force **per cylinder**
Lx	+0.5kg
TA / TQ / TU	+1.0kg
TL / TM / TT	+7.0kg

Please note that the retracting force can variate. It depends on:
- The friction in the guiding
- The side forces and bending moments on the guiding

When using cylinders with integrated tube breakage protection (V):

Cylinder type	Additional retracting force per cylinder with tube breakage protection
Cx 14xx V	+40 kg *(88 lbs)* Tubing lengths up to 4 m *(158″)* (when using longer tubing lengths, please contact customer service)
Cx 18xx V	+50 kg *(110 lbs)* Tubing lengths up to 4 m *(158″)* (when using longer tubing lengths, please contact customer service)

Synchronization

When synchronizing multiple controllers, the following points should be considered:

- The maximum system load per controller must not be exceeded (see table on page 2-4)
- When multiple controllers and lifting elements are connected to a system, mechanical tensions in the lifting elements can occur due to an uneven load condition. Moreover, larger systems require more hydraulic hoses, leading to increased friction resistance within the hoses and thus higher system loads. Additionally, synchronizing multiple motors results in a reduction in performance. The combination of these factors results in the system's reduced ability to move loads.
- Due to these considerations, Ergoswiss AG recommends reduced loading for synchronization:
    - 2 x controllers: max. load of 70%
    - 3 x controllers: max. load of 60%
    - 4 x controllers: max. load of 50%
- It is also important to perform the initial commissioning with half the load!