

1. Introduction

Thomson Movorail is a light weight rail system made of extruded aluminium profiles for loads up to 600 kg which is designed and manufactured by Danaher Motion to meet the latest national and international standards. Product quality is assured by our ISO 9001 certified quality system.

Read trough this manual carefully and study all the instructions supplied with the delivery of the components before starting the installation work.

Do not hesitate to contact us for more information.

Important!

- Read trough all installation instructions and all other diagrams and documents supplied with the delivery before commencing the installation in order to ensure that the work is carried out in a safe manner.
- No mechanical, electrical or pneumatic equipment delivered by Danaher Motion may be modified or be used in any other way than what is described in this manual without the written permission from Danaher Motion.
- Never walk or stand under a hanging load.
- Ensure that all ladders, lifting and climbing aids used during the installation are in good condition and that they are securely fastened.
- Make sure that only authorised people enter the working area.
- Never use any components that appear to be faulty or damaged. Replace them immediately with the components of the same make and type.
- The system must be labelled with a clearly visible max. load sign.
- All operators of the system should be instructed in using the system safely before using it.
- Never work with any electricity or compressed air switched on during the installation.
- The Movorail system may not be used before it complies with the EEC Machinery Directive (89/392/EEC) with valid amendments if it is to be used within the EEC area. In such cases electrical equipment is a part of the system the system also must comply with the demands in the Low Voltage Directive (72/23/EEC) and the directive for Electromagnetic Compatibility (89/336/EEC) with valid amendments.
- All equipment, work and documentation must, for both the electrical, mechanical and pneumatic areas, comply with all relevant national and international regulations, standards and EEC directives.
- Regular maintenance is necessary in order to obtain long life and to maintain a high safety level. Service instructions can be found in the "Movorail Service Manual" which is included in the delivery.
- Do not hesitate to contact Danaher Motion if you have any questions.

2. The components of the Movorail system

2.1 System with main girder rails

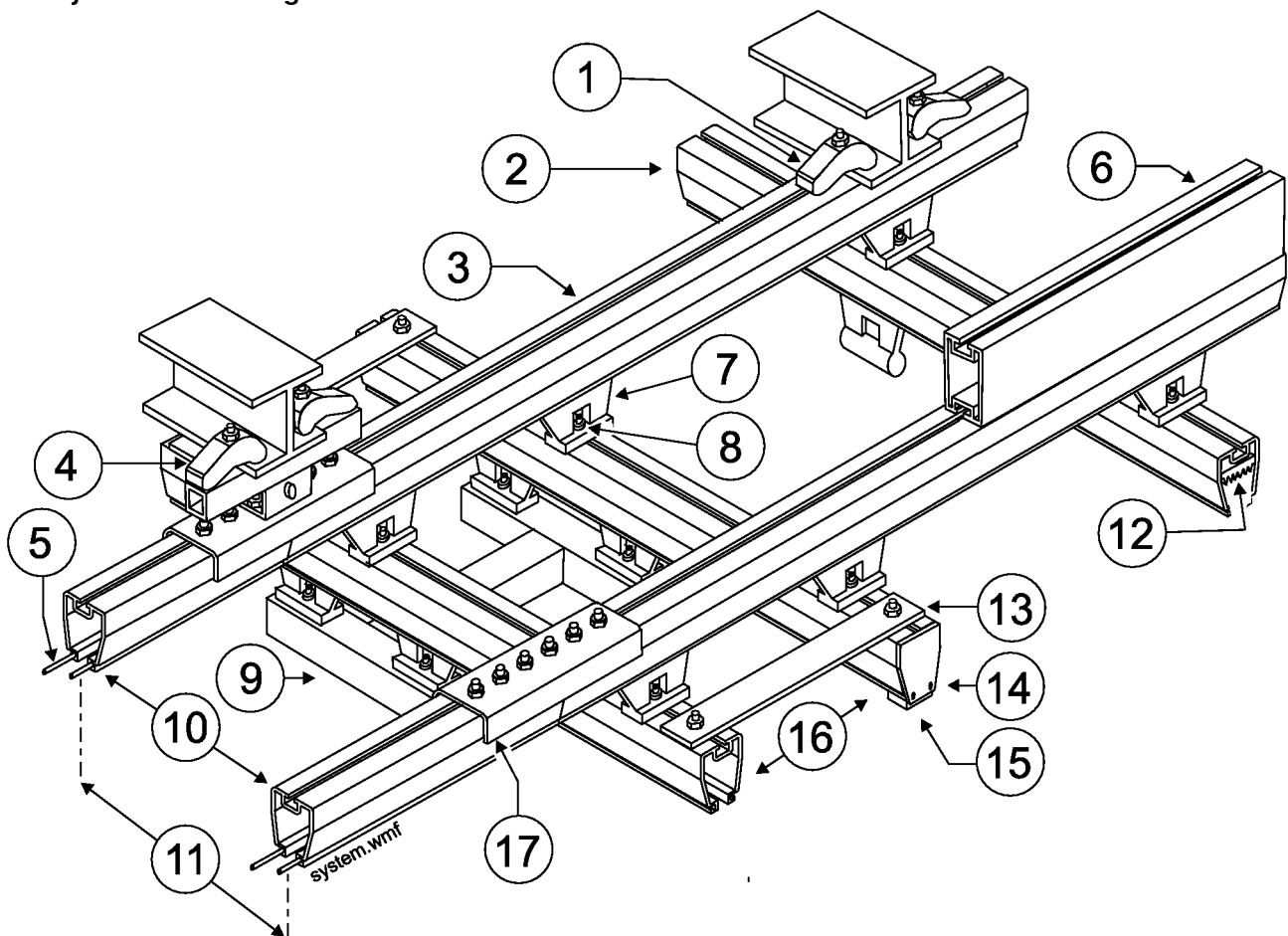


Figure 1: system with main girder rails

1. **I-beam clamps type VBKLA:** used to suspend a rail directly to an I-beam.
2. **Single main girder rail**
3. **Movorail rail:** load carrying profile which comes in five sizes: SPR 85, SPR 125, SPR 160A, SPR 295B and SPR 295W.
4. **Flexible suspension type DBSU:** suspension type that allows some misalignment between the I-beam and the rail.
5. **Locating pin:** a pin that guides the rails at connections.
6. **Reinforcement profile:** a profile that is used to reinforce profile SPR 160A.
7. **Bogie trolley:** trolley with horizontal wheels for guidance that is used for hanging loads.
8. **BUB:** attachment between bogie trolleys, distance girders and rails.
9. **Yoke:** frame in which a hoist or other loads can be suspended.
10. **Down shop rails:** the non-moving rails to which the suspensions are attached.
11. **Span:** the c/c distance between two down shop rails.
12. **Current track:** rail with copper conductors installed inside of the Movorail profile.
13. **Distance girder:** two types exist, flexible or rigid.
14. **End plate**
15. **End stop**
16. **Double main girder rails**
17. **Connection**

2.2 Single down shop rail

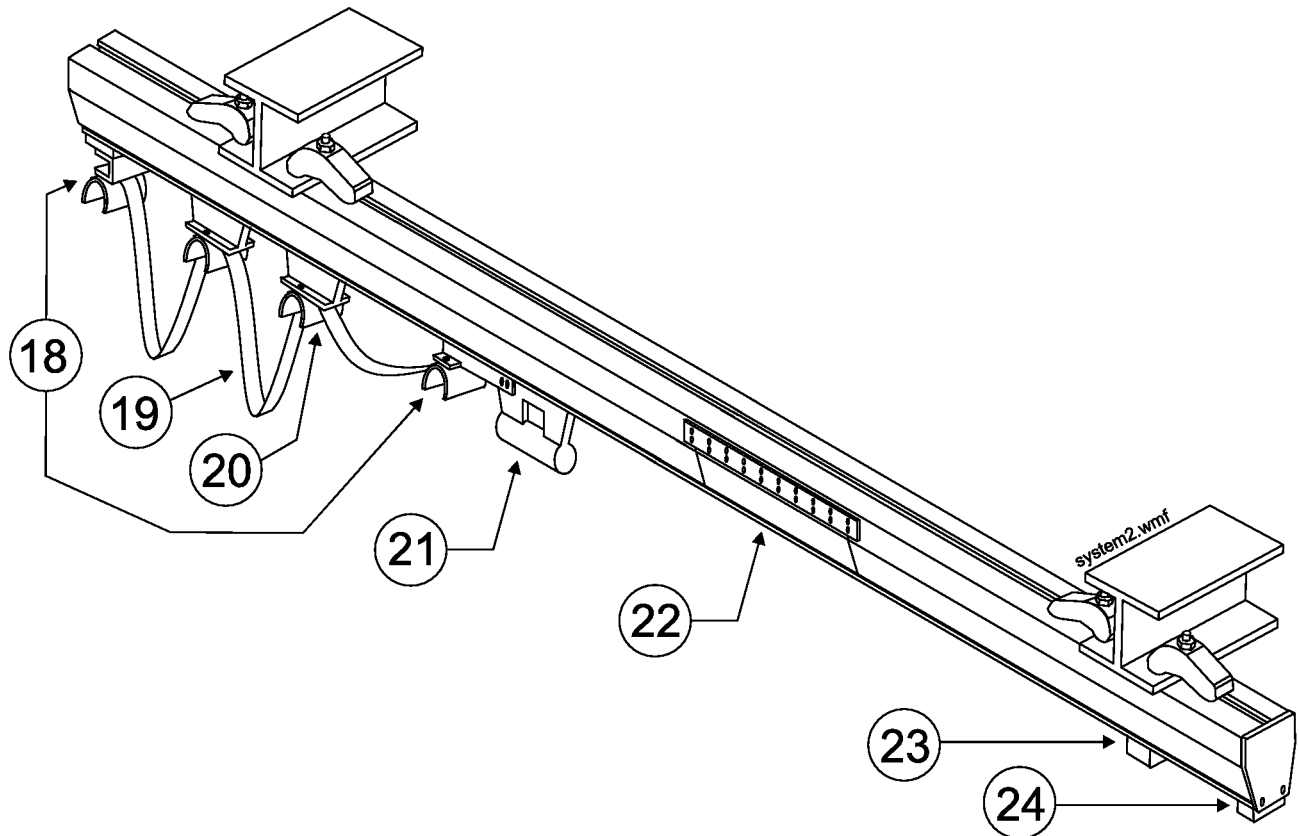


Figure 2: single down shop rail system

- 18. Rail and trolley cable attachment (kit):** components that fix cables to the end of a rail and a trolley.
- 19. Cable:** the type of cable/hose determines the type of cable trolley.
- 20. Cable trolley**
- 21. Crab trolley**
- 22. Service section:** a hatch that facilitates the service of trolleys and other components at long rails.
- 23. End stop**
- 24. End plate support:** a component used to attach the end plate to when the end stop is not placed in the end of the rail.

16. Testing the Movorail system

16.1 General about testing of the Movorail system

The system must be tested when the installation is completed. Follow all applicable instructions below. Please note that national and international regulations may call for further tests. The test area should be closed during all tests, only persons who are involved in the testing procedures may enter the area.

16.2 Inspection points at a test of a Movorail system

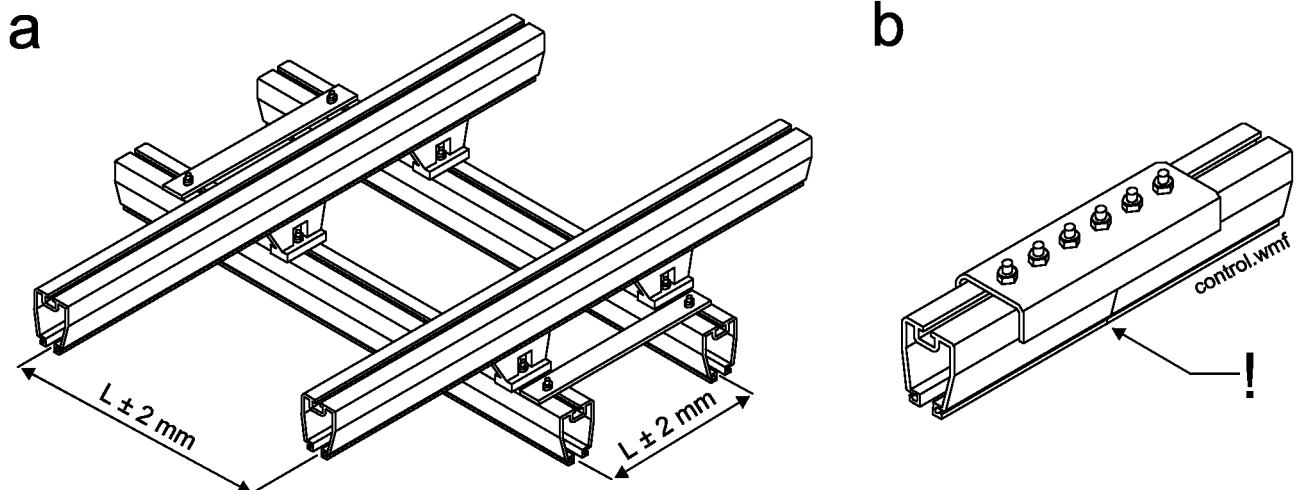


Figure 36: inspection of the system

1. Check the system against the drawing, if any is available.
2. Make sure the system is marked with an adequate number of max. load sign.
3. Check the span (a). Max. permissible parallel deviation between the rails is $\pm 2 \text{ mm}$.
4. Check so that there is no gap between the rails at the connections (b).
5. Check so that no rails are deformed or that they are subjected to any twisting or bending forces.
6. Check the tightening torque for all bolt connections, BUB;s, suspensions, connections and safety cables.
7. Test any electrical systems. Perform at least a continuity check of the bonding circuit, an insulation resistance test and a voltage test. Also make sure that the system is equipped with a lockable main switch placed beside it and that warning signs for electrical equipment are applied.
8. Run the system without load. Check all functions. Adjust.
9. Run the system with 25 % overload. Check all functions. Check all critical components after the test, especially bolt connections.
10. If rails of type SPR 295W are used, check so that there is no cracks in the weldings between the upper and the lower rail.
11. At last, check all rail and trolley tolerances again. Adjust if necessary.

17. Training and user instructions

17.1 General about training

All operators should have the sufficient training before the equipment is taken into use. The training required depends on the type of equipment and has to be defined on a case to case basis. The following instructions, however, apply to most types of equipment and are the basic information all users should be given. Also make sure that all users fulfil the requirements below.

1. Only those who are at least 18 years old may use the equipment.
2. Only those who are authorised by their superiors may use the equipment.
3. Only those who have been trained may use the equipment.
4. Only those who know all safety devices and operating controls of the system may use the equipment.

17.2 User instructions

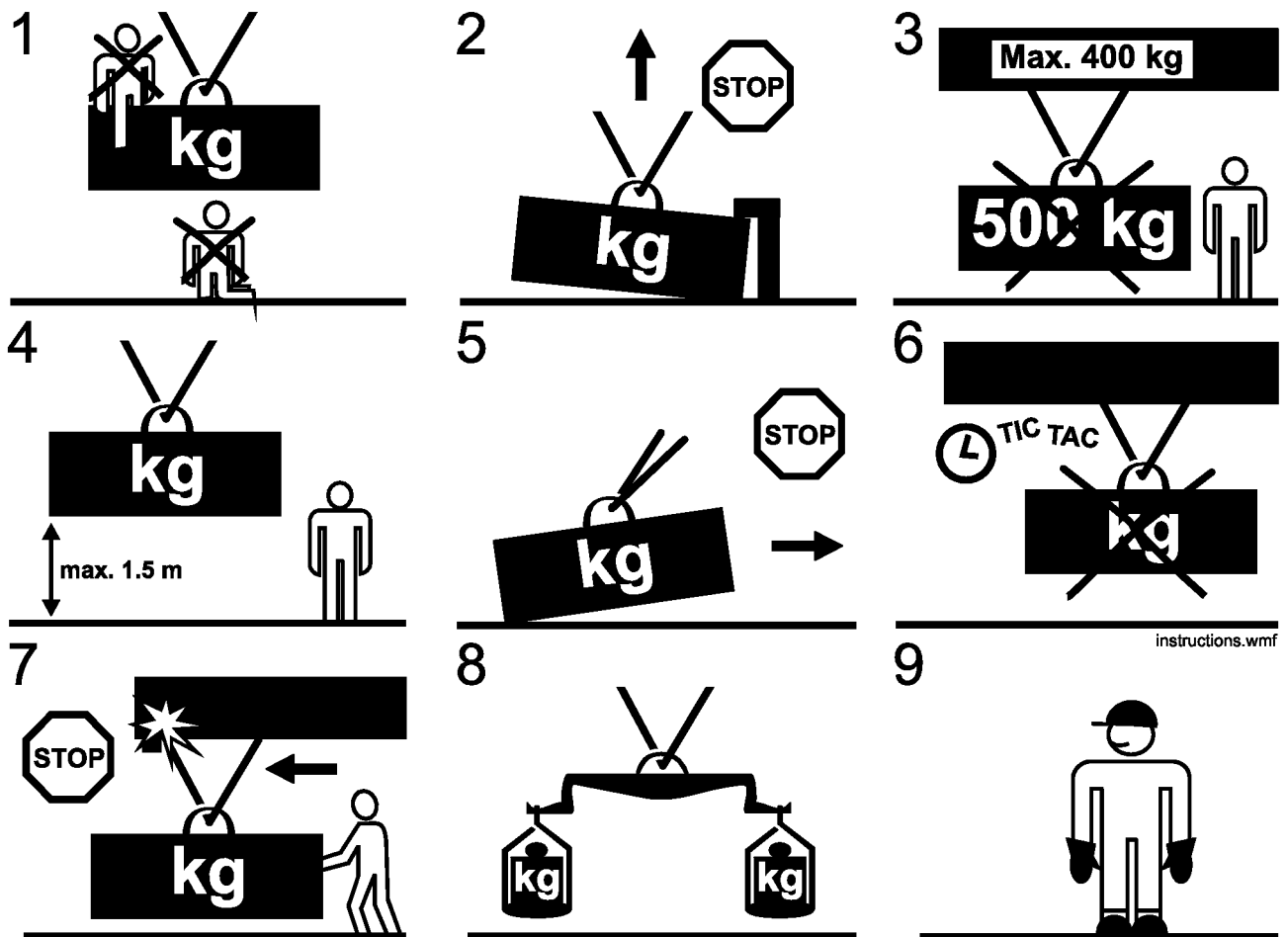


Figure 37: user instructions

1. Never move people with the system. Never lift loads above people.
2. Never force loads that are stuck or jammed, to move.
3. Never apply overload to the system.
4. Avoid lifting loads higher than 1,5 m above floor level.
5. Never pull loads along the floor.
6. Never leave hanging loads unattended at any time.
7. Never push loads intentionally into the end stops.
8. Always try to lift loads from their centre of gravity.
9. Wear hard hat, safety shoes and protective gloves at all times.

18. Technical data

18.1 Data for the Movorail profiles

	SPR 85	SPR 125	SPR 160A	SPR 295B	SPR 295W	SPF 135
Material	Anodised extruded aluminium					
Colour	Natural aluminium					
X (mm)	85	125	160	295	295	135
C (mm)	68,8	71,5	73,5	73,5	73,5	70
Standard profile lengths (m)	4 / 5 / 6 / 8	4 / 5 / 6 / 8	4 / 5 / 6 / 8	4 / 5 / 6 / 8	4 / 5 / 6 / 8	3,6 / 4,6 / 5,6
Inertia (cm ⁴)	97	333	812	1368	3700	556
Weight / meter (kg/m)	3	5	7,8	14	14,1	6,2
Profile area (cm ²)	11	18,6	28,7	51,5	51,5	22,8
Modulus of elasticity (N/mm ²)	70 000	70 000	70 000	70 000	70 000	70 000

Table 8: profile data

SPR 85, SPR 125, SPR 160A

SPR 295B, SPR 295W

SPF 135

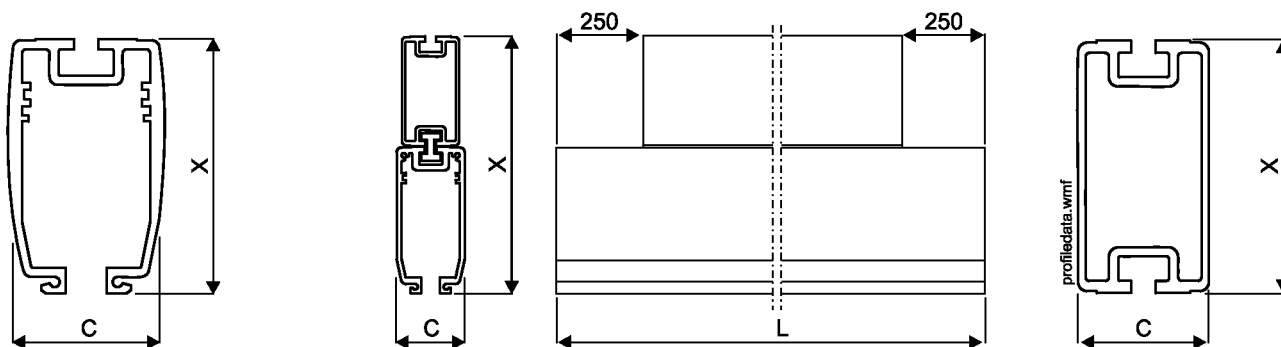


Figure 38: profile dimensions

18.2 Tightening torque for bolts

The table is valid for both normal bolts and T-slot bolts. The bolt grade is normally embossed on the bolt heads, see the figure below. We recommend using at least bolt grade 8.8. Use a calibrated torque wrench to gauge the torque.

Bolt dimension	Grade	Zinc-pl. dry	Zinc-pl. oiled
M6	8.8	9,4 Nm	8,4 Nm
M8	8.8	23,0 Nm	20,6 Nm
M10	8.8	45,1 Nm	40,4 Nm
M12	8.8	77,8 Nm	69,7 Nm
M16	12.9	319,6 Nm	286,3 Nm

Table 9: tightening torque for bolts

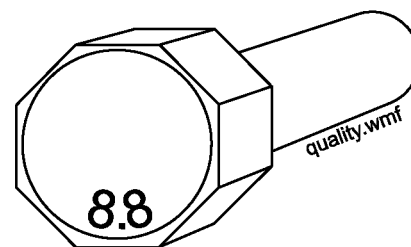


Figure 39: bolt grade

18.3 Load diagram for a rail with a single load

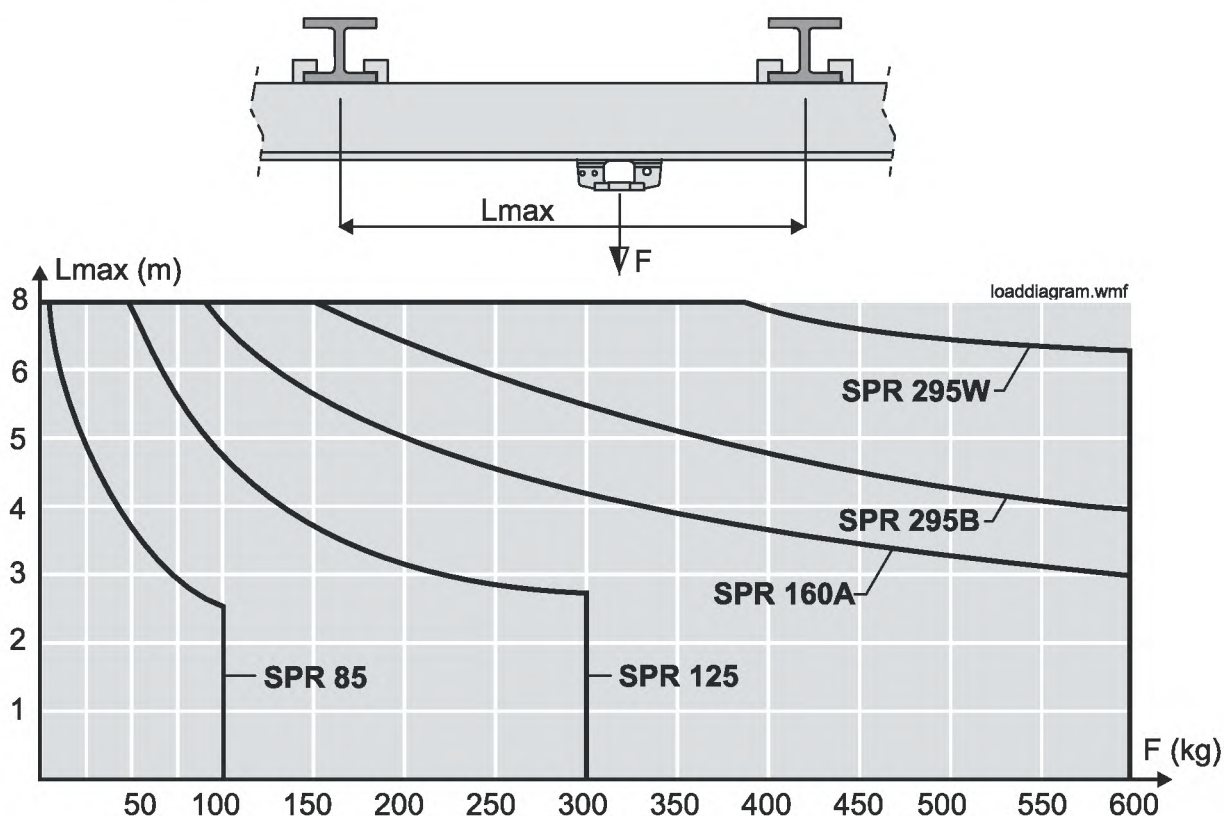


Figure 40: diagram for max. recommended distance between suspensions at a single load

The diagram is based on a maximum deflection of $1/500$ of the distance between the suspensions (L_{max}) and shows the maximum recommended distance between the suspensions at a given load.

18.4 Technical data for current track type SB

Max. voltage	400 V	Current track conductor cross-section	9 mm ²
Protection class	IP 21	Max. current track	55 A
Ambient temperature	-20 °C – + 55 °C	Max. current connection	25 A
Voltage drop	0,103 V / m @ 25 A	Max. current power supply track	25 A
Max. speed straight rails	2 m/s	Max. current pick up @ 60 % ED	10 A
Max. speed curved rails	0,5 m/s	Max. current pick up @ 100 % ED	6A

Table 10: technical data for current track

18.5 Voltage drop in cables

Long cables may lead to a significant voltage drop that may lead to malfunctioning. To avoid this it may be necessary to increase the conductor cross-section. The formulas below can be used to calculate the voltage drop. If the voltage drop exceeds 5 % (Ufactor less than 0,95) of the nominal voltage, a larger cross-sectional area is necessary.

Formula 1. $U_{end} = U_{start} - (2 \times L \times R \times I_{max})$

Formula 2. $U_{end} / U_{start} = U_{factor}$

Formula 3. $U_{factor} > 0,95 = OK$

$U_{factor} < 0,95 = \text{not OK}$

I_{max} = max. current to be transmitted in cable

U_{factor} = voltage drop coefficient

U_{end} = voltage at the end of the cable

U_{start} = voltage at the start of the cable

L = length of cable

R = resistance per meter (see table below)

Conductor area	Resistance / meter (R)
1 mm ²	0,0175
1,5 mm ²	0,0116
2,5 mm ²	0,0070

Table 11: resistivity

Example:

If: $U_{start} = 24 \text{ V}$, $L = 40 \text{ m}$, conductor area = 1,5 mm², $I_{max} = 1,5 \text{ A}$

Then: $U_{end} = 24 - (2 \times 40 \times 0,0116 \times 1,5) = 22,608 \text{ V}$

$U_{factor} = 22,608 / 24 = 0,94$

$0,94 < 0,95 = \text{not OK}$, the voltage drop is to large

Conclusion: a larger conductor cross-section is necessary, e.g. try with 2,5 mm².

Einführung

Das bewährte Thomson Movorail System von Danaher Motion wird seit mehr als 20 Jahren von Unternehmen weltweit eingesetzt und hat sich zu einem der führenden Leichtgewicht-Schienensysteme auf dem Markt entwickelt.

Der Erfolg des Movorail Systems lässt sich auf verschiedene Faktoren zurückführen: hoch modulare Bauweise, leichtgewichtiges Material, einfache und schnelle Installation sowie ein breit gefächertes Zubehörangebot zur Ergänzung der Produktreihe. Die Installation eines Movorail Systems gestaltet sich genau so einfach, als wenn Sie ein System verlegen, erweitern, umbauen oder neu anordnen. Mit anderen Worten, ein Movorail System stellt eine Investition dar, die sich problemlos an veränderte Anforderungen anpassen lässt.

In diesem Dokument werden nur die Standardkomponenten der Movorail Produktreihe behandelt, wir verfügen jedoch darüber hinaus über langjährige Anwendungserfahrung und ein umfassendes Netzwerk an Händlern und Systemhäusern, die Sie bei Ihrem Projekt gerne unterstützen.

Definition von Abmessungen und Richtungen

