

CATL产线机器人管线包方案说明

CATL production line robot pipeline package scheme description

中国 上海 2023年01月06日

工业智连系统服务商

企业官网/website : www.velledq.com

CONTENTS

- 01 企业介绍**
- 02 产品谱系**
- 03 企业资质**
- 04 产品认证**
- 05 项目概况**
- 06 改善建议**
- 07 设计方案**
- 08 产品安装**
- 09 管线配套**
- 10 电气连接**



一、企业介绍

COMPANY PROFILE

VELLEDQ
— 为乐电气 —

为乐电气（上海）有限公司成立于2012年3月20日，系专业从事工业自动化连接系统及解决方案的研发、设计、生产、安装施工及销售业务。VELLEDQ系上海市“高新技术企业”和“专精特新”企业。VELLEDQ运营和生产本部位于上海，并在福建建设了全资的生产基地，设置：研发中心、电缆生产车间、塑料成型车间、机加工中心、装配车间、仓储物流中心 etc 区域。

VELLEDQ拥有独立的研发、生产、物流和对外安装施工团队，主要产品有：机器人管线包、圆型接插件、分线盒、重载连接器、I/O总线模块、半导体行业线束、控制柜集成等产品。

VELLEDQ产品经过CE、ROSH、TUV、ISO9001:2015 质量体系认证。

VELLEDQ为乐电气产品广泛应用于工装自动化、新能源行业、锂电、半导体集成、汽车行业、3C行业、轨道交通、风力发电设备、港口机械、物流行业、工程机械、塑料机械、自动化仪器仪表、灯具、电梯、电机马达及非标定制等行业。



Website: <http://www.velledq.com>

二、产品谱系

Product Pedigree

VELLEDO
— 为乐电气 —



01 机器人管线包



02 现场安装接插件



03 预铸线束产品



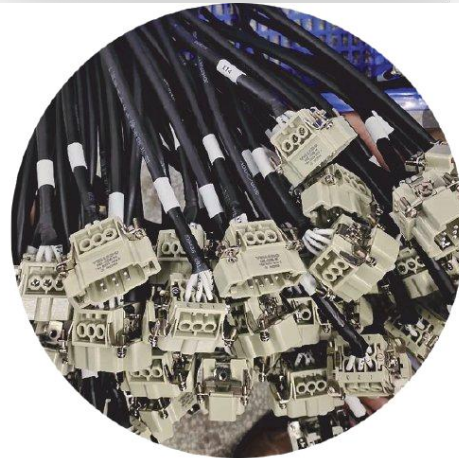
04 分线盒(集线器)



05 重载连接器



06 I/O总线模块



07 非标定制线束



08 半导体成套集成

三、企业资质

Enterprise qualification



VELLEDQ为乐电气系上海市“高新技术企业”、“专精特新”企业，并取得ISO9001:2015质量体系认证和ISO14001环保体系认证。



Website: <http://www.velledq.com>

四、产品认证

Product certification



CERTIFICATE OF CONFORMITY FULLNESS EXAMINATION OF TECHNICAL FILE

Certificate No. 10.16.0897
Date of issue 26/10/2022
Valid From 26/10/2022
The Certificate is valid until 25/10/2027

Applicant (Name & Address)	VELLE Electrical(Fujian) Co., Ltd. No.1 Building, Immigration entrepreneurship Park, Shugang Road, Yunling Development Zone, Yunxiao County, Fujian Province, China
Manufacturer (Name & Address)	Same as applicant
Report No.	RoHS Report No.: LCSE090522006R
Product Description	Robot pipeline package
Model(s)	WL-D48-001(See Annex for details)
Directive(s)	2011/65/EU RoHS Directive
Standard(s)	EN IEC 63000:2018

This is to certify that, upon the relevant application of the above-mentioned applicant, EUROCERT as Third-Party Authority has reviewed the Technical Construction File of the described product, which found to fulfill the basic health and safety prerequisites of above-mentioned Directive(s).

- Note:**
- The manufacturer should issue a Declaration of Conformity according to the basic requirements of the applicable standards and relevant directives.
 - The CE marking can be affixed on the above-mentioned product with the manufacturer's responsibility, if all relevant and applicable directives are complied with.
 - All modifications to the Technical File should be first submitted to the Third-Party Inspection Authority to ensure further validity of this attestation. This certificate is valid only for the product and configuration described and in conjunction with the technical data detailed above.



Check the validity of the Certificate by scanning the QR code at right.
EUROCERT S.A. 89 Chios & Lykaviteos str., 14452, Metamorphosi - Greece
T +30 210 62.52.495, +30 210 62.53.927, F +30 210 62.03.018, M eurocert@otenet.gr



ANNEX TO CERTIFICATE NO.: 10.16.0897 Technical Characteristics of Model

No.	Product Name	Model Name	Material Science	Description	Weight
1	Fixed base	WL-D48-001	Plastic parts	The fixing seat can effectively protect and support the hose by embedding various spherical components.	83g
2	Locating ring	WL-D48-002	Plastic parts	The positioning ring of the pipeline package is to prevent the hose from being deviated and damaged in the process of impact.	25g
3	Anti-collision billiard ball	WL-D48-003	Plastic parts	The anti-collision ball provides reliable anti-collision and wear-resistant protection, greatly extending the service life of the pipeline package.	42g
4	End sleeve	WL-D48-004	Plastic parts	The end sleeve is used to fix the splitter to prevent the cable from falling off and affecting the work of the robot.	51g
5	Front end sleeve	WL-D48-005	Plastic parts	The front end sleeve is used to fix the splitter to prevent the cable from falling off and affecting the work of the robot.	68g
6	Ball adapter	WL-D48-006	Plastic parts	The ball adapter is effective in protecting and supporting the hose.	30g
7	Movable tiles	WL-D48-007	Plastic parts	The movable bushing allows flexible rotation of the cable inside the hose to prevent damage to the cable.	22g
8	Guide sleeve	WL-D48-008	Plastic parts	The guide sleeve is used by the robot to change direction to protect the hose, and protect the internal cable from damage.	44g
9	Splitter	WL-D48-009	Plastic parts	The splitter is a fixed size cable that is not easy to move and protects the cable from damage.	61g
10	Fixed base	WL-D70-001	Plastic parts	The fixing seat can effectively protect and support the hose by embedding various spherical components.	153g
11	Locating ring	WL-D70-002	Plastic parts	The positioning ring of the pipeline package is to prevent the hose from being deviated and damaged in the process of impact.	67g
12	Anti-collision billiard ball	WL-D70-003	Plastic parts	The anti-collision ball provides reliable anti-collision and wear-resistant protection, greatly extending the service life of the pipeline package.	99g
13	End sleeve	WL-D70-004	Plastic parts	The end sleeve is used to fix the splitter to prevent the cable from falling off and affecting the work of the robot.	153g
14	Front end sleeve	WL-D70-005	Plastic parts	The front end sleeve is used to fix the splitter to prevent the cable from falling off and affecting the work of the robot.	156g
15	Ball adapter	WL-D70-006	Plastic parts	The ball adapter is effective in protecting and supporting the hose.	156g

Check the validity of the Certificate by scanning the QR code at right.
EUROCERT S.A. 89 Chios & Lykaviteos str., 14452, Metamorphosi - Greece
T +30 210 62.52.495, +30 210 62.53.927, F +30 210 62.03.018, M eurocert@otenet.gr



ANNEX TO CERTIFICATE NO.: 10.16.0897 Technical Characteristics of Model

No.	Product Name	Model Name	Material Science	Description	Weight
16	Movable tiles	WL-D70-007	Plastic parts	The movable bushing allows flexible rotation of the cable inside the hose to prevent damage to the cable.	83g
17	Guide sleeve	WL-D70-008	Plastic parts	The guide sleeve is used by the robot to change direction to protect the hose, and protect the internal cable from damage.	138g
18	Splitter	WL-D70-009	Plastic parts	The splitter is a fixed size cable that is not easy to move and protects the cable from damage.	154g
19	3-axis large sheet metal	ABB01-D48-3J-B06	Sheet metal parts	The 3-axis large sheet metal combines the fixed seat, guide sleeve and anti-collision ball to fix the telescopic spring.	4.42KG
20	70 3-axis large sheet metal	KR01-D70-3J-B06	Sheet metal parts	70 models of 3-axis large sheet metal combination hose and cavity basin box assembly play the role of fixing the telescopic spring.	7.74KG
21	Cover guard	WL-D48-3J-BH04	Sheet metal parts	The cover guard is effective in protecting the expansion spring.	2.17KG
22	Cover guard	WL-D70-3J-BH04	Sheet metal parts	The cover guard is effective in protecting the expansion spring.	5.0KG
23	Telescopic spring	WL-R-Spring8	Sheet metal parts	The expansion spring can optimize the expansion of the pipeline in a small range, providing good traction and recovery capability for the 3-axis to 6-axis pipeline package of the robot.	0.75KG
24	70 Spring	WL-R-Spring70	Sheet metal parts	The spring optimizes the small range expansion and contraction of the pipeline, providing good traction and recovery capability for the 3-axis to 6-axis pipeline package of the robot.	0.96KG
25	3-axis extension sheet metal	WLVCS-D48-3J-B09	Sheet metal parts	The 3-axis extension sheet metal protects and supports the hose.	0.83KG
26	3-axis 70 extension sheet metal	WLVCS-D70-3J-B09	Sheet metal parts	3 AXIS 70 EXTENDED SHEET METAL PROTECTION AND SUPPORT HOSE.	0.96KG
27	6-axis support (tennis racket)	WQP140-12-D34-360	Sheet metal parts	The 6-axis bracket is used to provide a support point and can be equipped with various fixing components.	2.11KG
28	6-axis support (tennis racket)	WQP160-12-D34-380	Sheet metal parts	The 6-axis bracket is used to provide a support point and can be equipped with various fixing components.	2.28KG
29	6-axis support (tennis racket)	WQP200-12-D34-450	Sheet metal parts	The 6-axis bracket is used to provide a support point and can be equipped with various fixing components.	2.97KG

Check the validity of the Certificate by scanning the QR code at right.
EUROCERT S.A. 89 Chios & Lykaviteos str., 14452, Metamorphosi - Greece
T +30 210 62.52.495, +30 210 62.53.927, F +30 210 62.03.018, M eurocert@otenet.gr



Website: <http://www.velledq.com>

VELLEDQ为乐电气机器人管线包系统取得CE、ROHS认证。

五、项目概况

Project overview

VELLEDQ
— 为乐电气 —

根据CATL现场机器人运行的情况，主要问题点汇总如下：

- 1、部分机器人无配置管线包保护系统，仅使用扎带固定，系比较简单的线束连接处理，导致线缆外被及连接器安装稳定性不佳，管线磨损严重，存在使用安全隐患。
- 2、使用普通的塑料软管套住管线，出现软管磨破现象不少。
- 3、现场管线包采取简易的固定卡死，特别机器人2轴下部、2轴上部、4-5轴端及6轴前端出现软管断开。
- 4、部分机器人6轴无撑高处理，导致5-6轴软管及管线磨损严重。
- 5、机器人底部1轴部分未做快插快拔处理，给ME日常维修维护带来极大的不便利，导致维护工期内耗严重。
- 6、个别工位因未有效观察不同使用工况之管线的运行轨迹，导致6轴处的网球拍没有起到更利于保护管线的作用。
- 7、现场大多管线包由集成商随机安排人员装配，专业度受限，出现配件错装，管线包未能很好根据运行轨迹进行调试问题比较突出。



Website: <http://www.velledq.com>

六、改善建议

Suggestions for improvement

VELLEDQ
— 为乐电气 —

因CATL各基地机器人使用量能较大，各工位机器人运行轨迹各不相同，后续维护工作量不小。改善建议如下：

1、抓源头，建标准：有必要建立C公司产线机器人管线包应用及安装技术标准和要求，并列入新项目集成技术协议。后面将提供近几年C公司大量使用的机器人管线包方案，敬供参考使用。

2、保性能，控成本：原则上能够使用3-6轴的管线包方案，不用1-6轴；能用挑高式方案不用伸缩弹簧，特别是不要輕易使用过于复杂的管线包方案；机器人底部1轴管线使用接插件，实现快插快拔，便于设备分离运输和后续维护；管线尽可能从2轴接入从1轴内部引出。

3、重于安装及调试：管线包安装可以交予管线包供应商派人执行；也可由集成商指定人员交由管线包供应商进行安装及调试培训认可后，再行上岗作业。

4、由各基地ME部门针对具体工位机器人管线包应用不佳状况，可由管线包供应商派人进行现场确认并提供改善建议后实施改造。

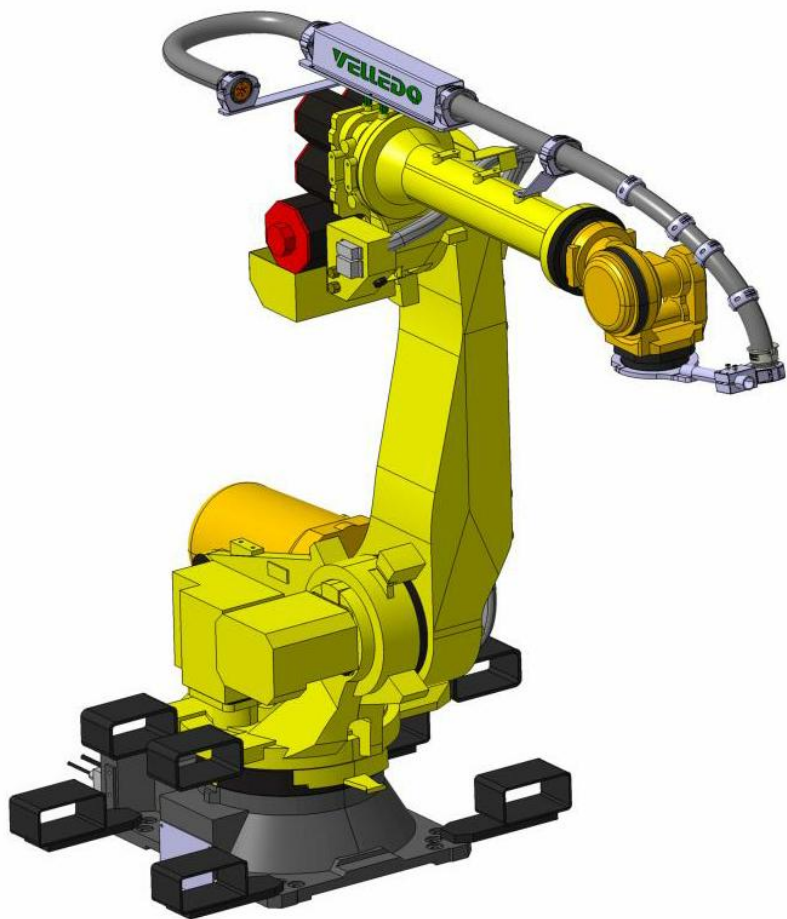


Website: <http://www.velledq.com>

七、设计方案

Design Scheme

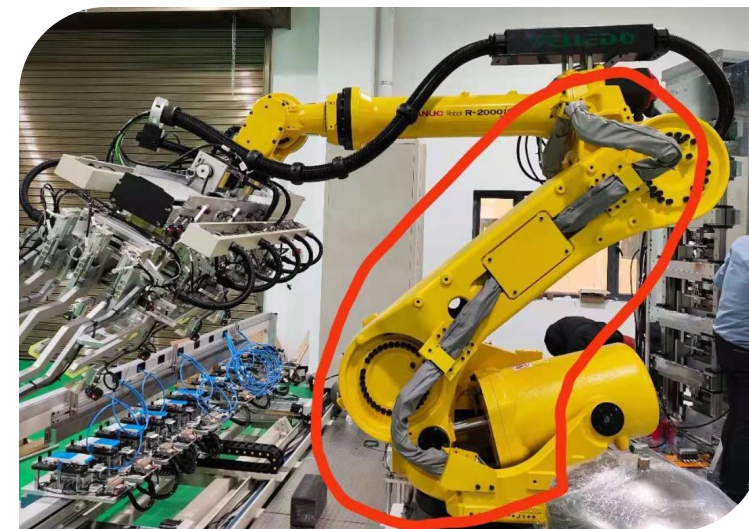
VELLEDQ
— 为乐电气 —



1、FANUC 2000iC 165F/120F设计方案，充分利用机器人本体1-3轴防火布，气管和信号与本体线体一并布线，故管线包设计拟采取3-6轴的设计样式，个别工位于3-4轴处再加一挑高设计。

产品型号：FANUC-R-2000iC-210F-D48-TH-TG-3J-6J

施工案例如下：



Website: <http://www.velledq.com>

七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —



2、FANUC 2000iC 165F/120F设计方案，如若夹具的管线拟不通过机器人本体管线走线，可通过采取1-6轴的弹簧挑高式的设计样式。

产品型号：FANUC-R2000iC-210F-D48-TH-TG-1J-6J

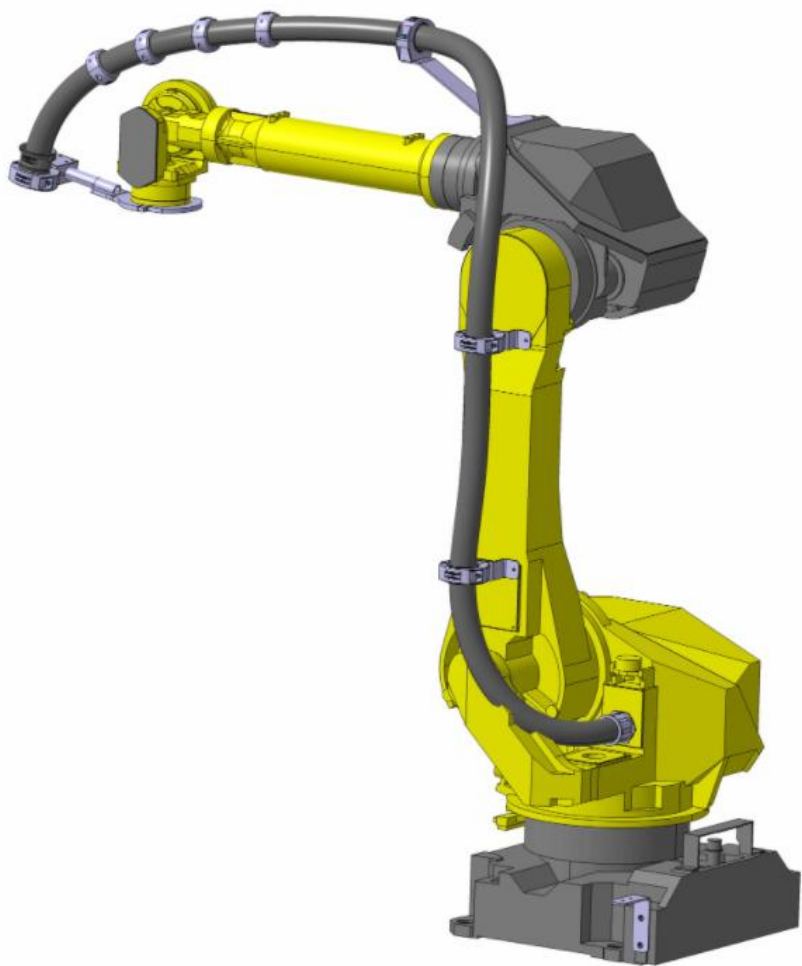


Website: <http://www.velledq.com>

七、设计方案

Design Scheme

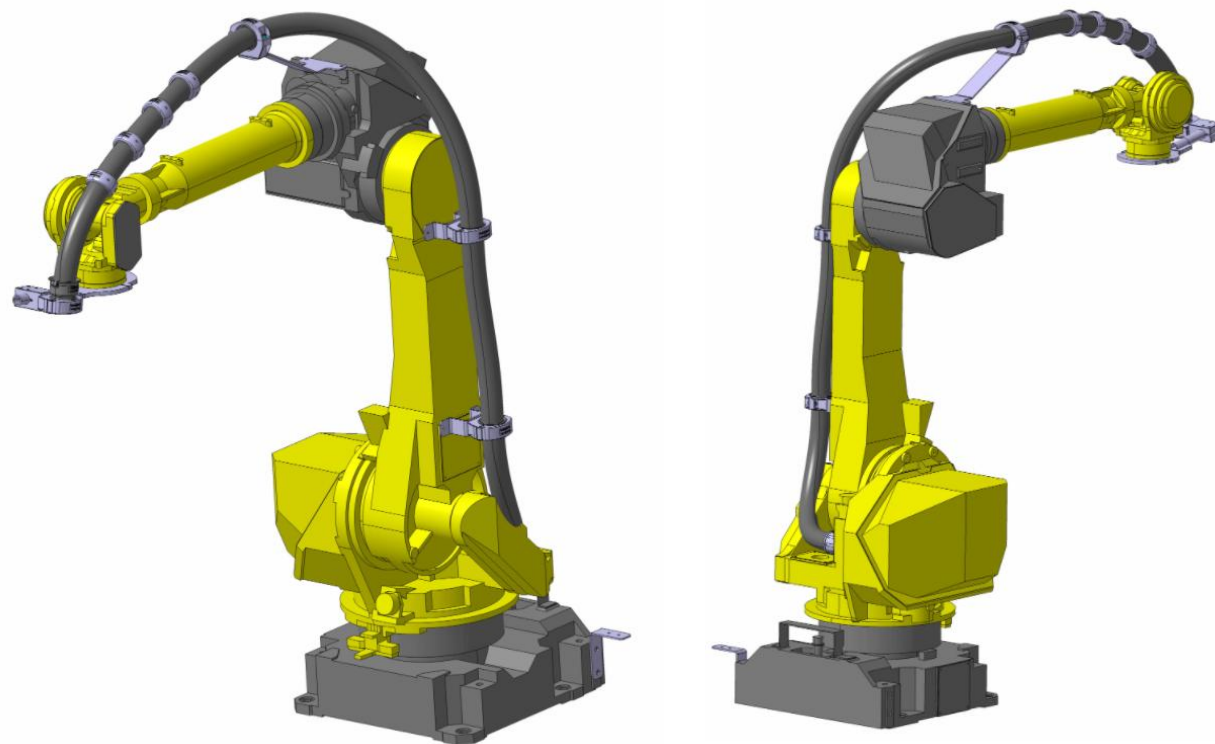
VELLEDQ
— 为乐电气 —



3、FANUC-M-710iC45M/70M设计方案，管线包设计可采取1-6轴的挑高设计样式。

产品型号：FANUC-M-710iC45M-D48-TG-1J-6J

设计效果如下：



Website: <http://www.velledq.com>

七、设计方案

Design Scheme

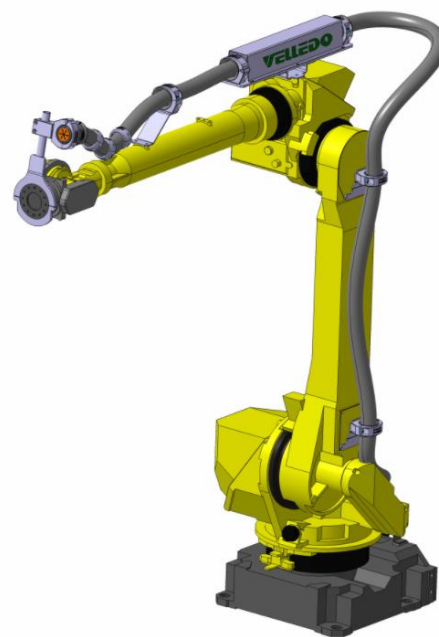
VELLEDQ
— 为乐电气 —



4、FANUC-M-710iC45M/70M设计方案，管线包设计可采取1-6轴的弹簧挑高设计样式。

产品型号：FANUC-M-710iC45M-D48-TH-TG-1J-6J

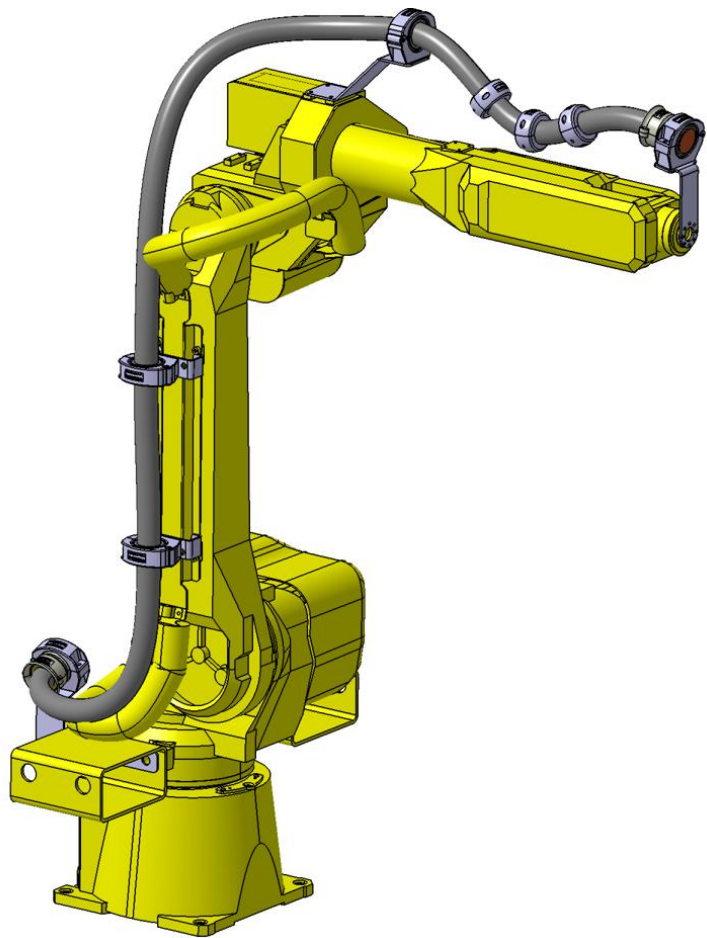
设计效果如下：



Website: <http://www.velledq.com>

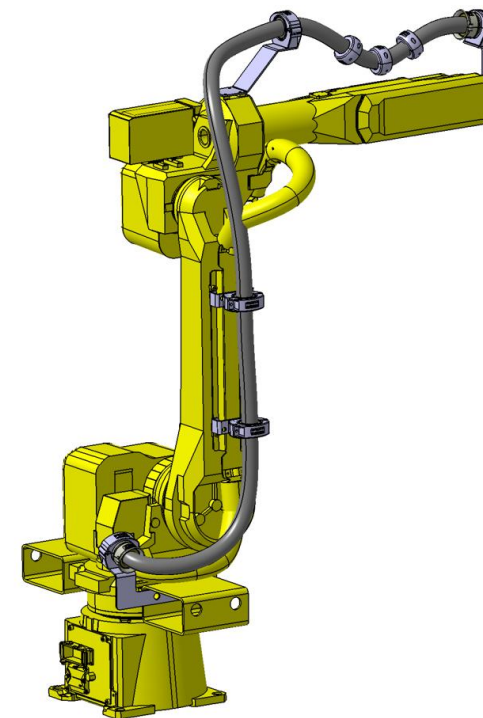
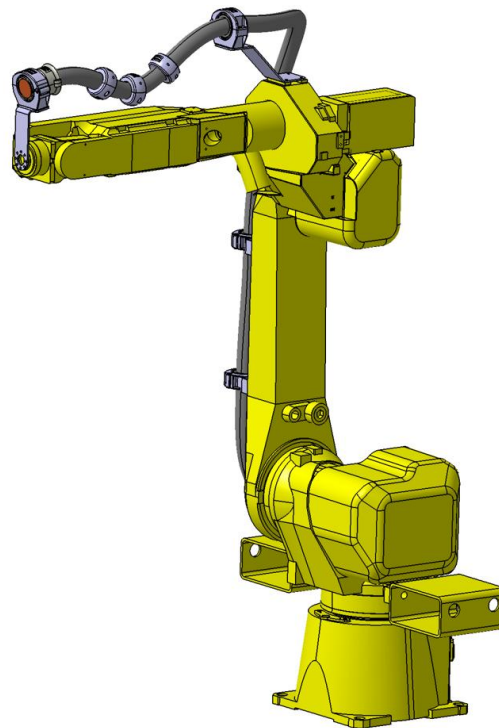
七、设计方案

Design Scheme



5、FANUC-M-20iA-35M设计方案，管线包设计可采取1-6轴挑高式的设计方案，这也是当前C公司新项目主要运用的管线包设计样式。

产品型号：FANUC-M-20iA-35M-D36-TG-1J-6J



七、设计方案

Design Scheme

6、KR120-R2700-2设计方案，管线包改造设计可采取3-6轴弹簧挑高式的设计方案，这也是比较经济的方案。

产品型号：KUKA-KR120-R2700-2-D48-TH-TG-3J-6J



Website: <http://www.velledq.com>

七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

7、KR120-R2700-2设计方案，管线包改造设计可采取1-6轴弹簧挑高式的设计方案。

产品型号：KUKA-KR120-R2700-2-D48-TH-TG-1J-6J



Website: <http://www.velledq.com>

七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

8、KR210-R2700-2设计方案，管线包改造设计可采取3-6轴弹簧式的设计方案。

产品型号：KUKA-KR210-R2700-2-D48-TH-3J-6J



Website: <http://www.velledq.com>

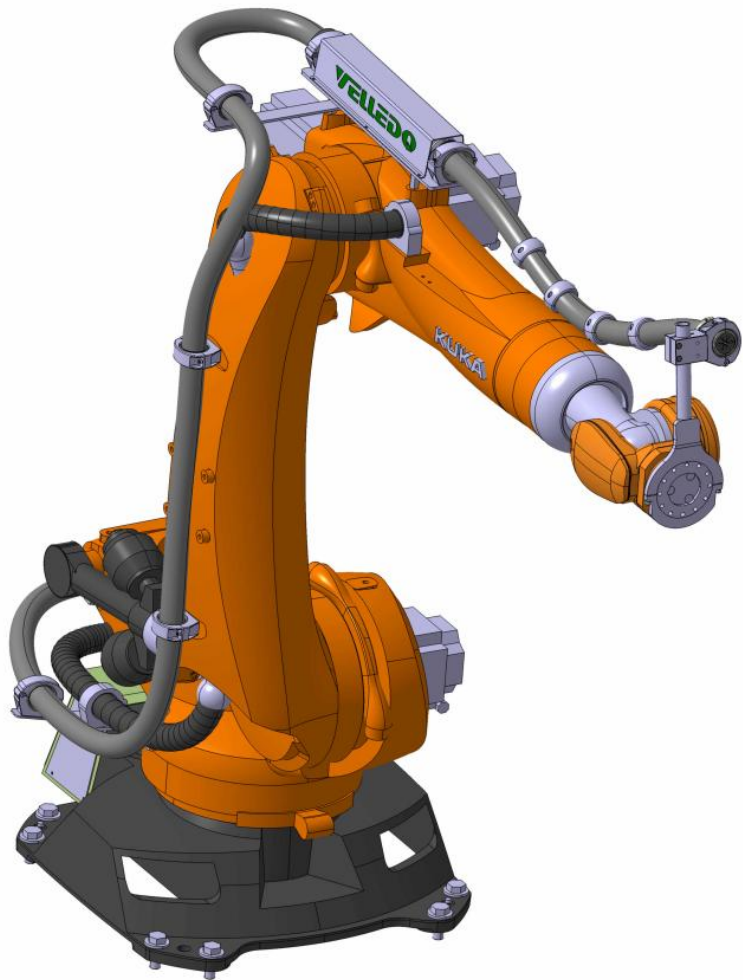
七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

9、KR210-R2700-2设计方案，管线包改造设计可采取1-6轴弹簧式的设计方案。

产品型号：KUKA-KR210-R2700-2-D48-TH-1J-6J



HONOR 305 5G
Quad Camera



Website: <http://www.velledq.com>

七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —



10、KUKA-KR60-3设计方案，管线包改造设计可采取1-6轴弹簧式的设计方案。

产品型号：KUKA-KR60-3-D48-TH-1J-6J

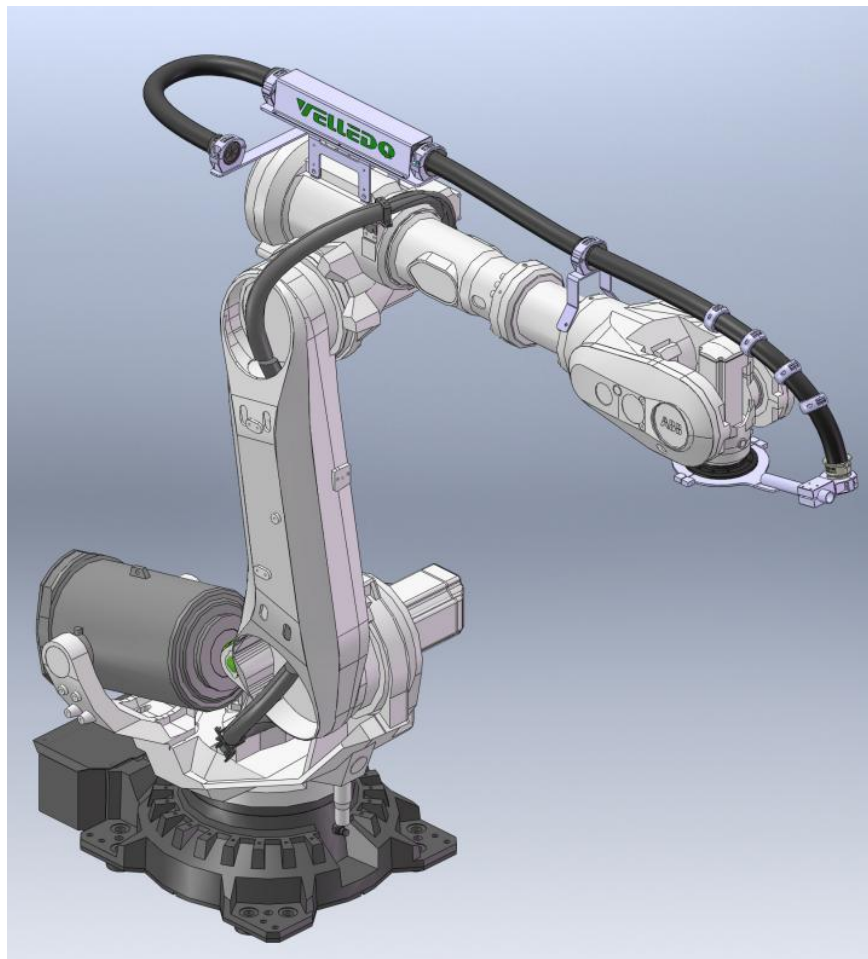


Website: <http://www.velledq.com>

七、设计方案

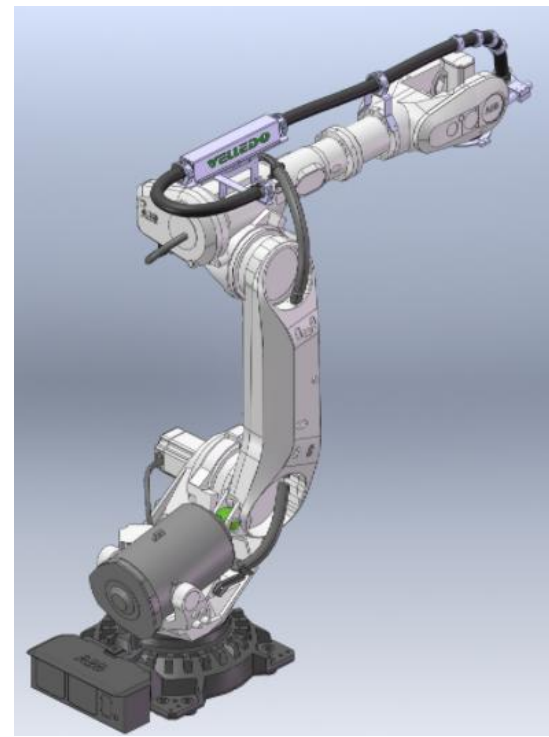
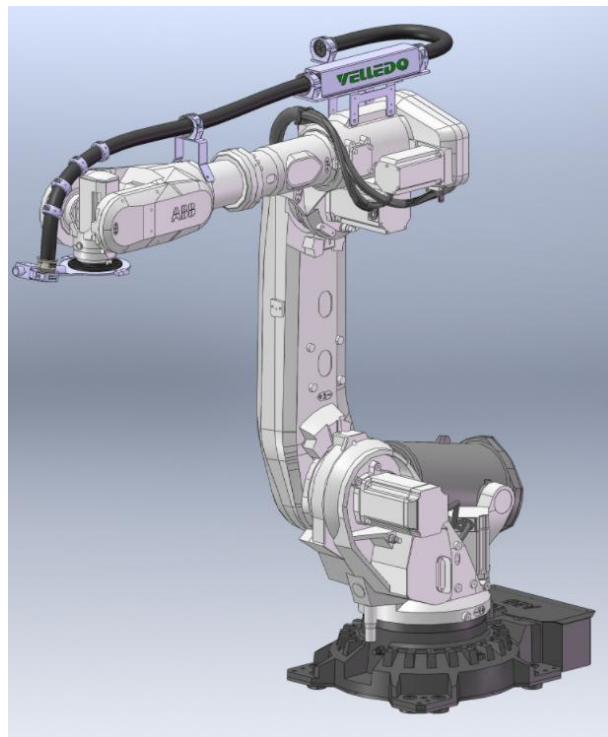
Design Scheme

VELLEDQ
— 为乐电气 —



11、ABB-IRB6700设计方案，管线包设计可采取3-6轴弹簧挑高式的设计方案。

产品型号：ABB-IRB6700-150-320-D48-TH-TG-3J-6J



Website: <http://www.velledq.com>

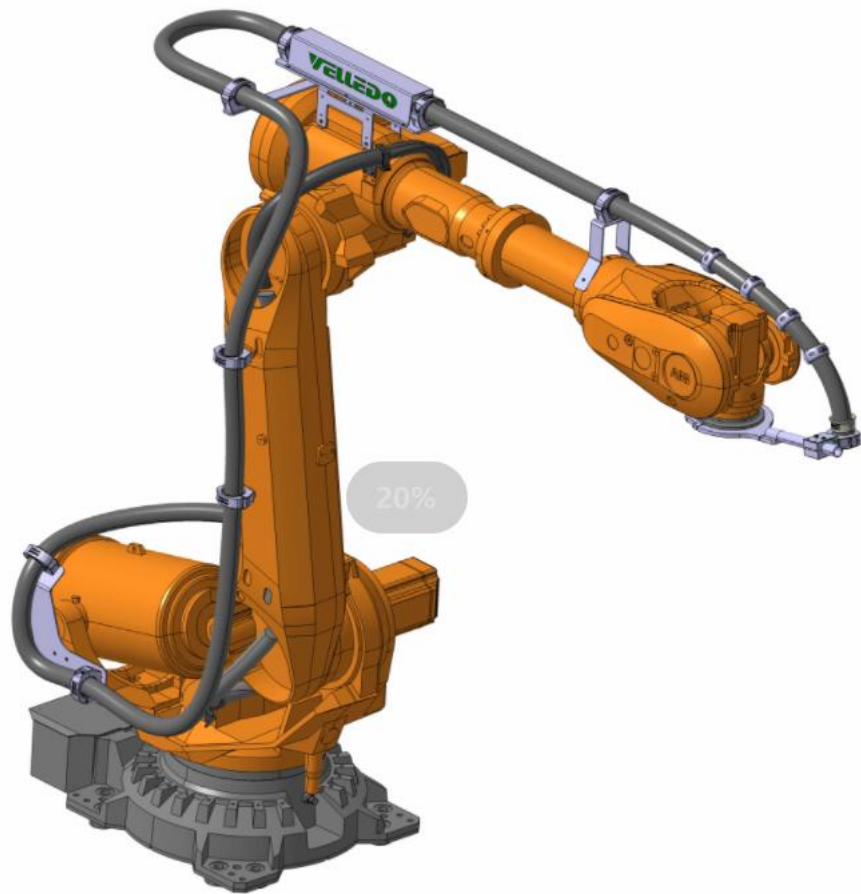
七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

12、ABB-IRB6700设计方案，管线包设计可采取1-6轴弹簧挑高式的设计方案。

产品型号：ABB-IRB6700-150-320-D48-TH-TG-1J-6J



Website: <http://www.velledq.com>

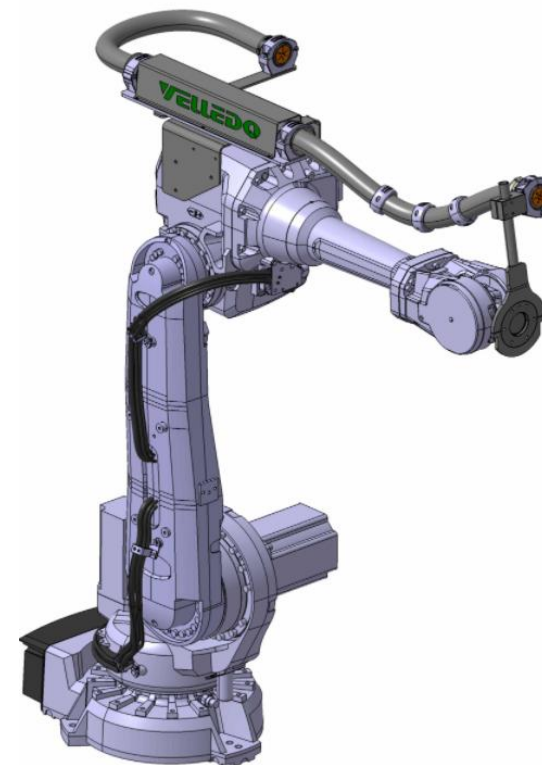
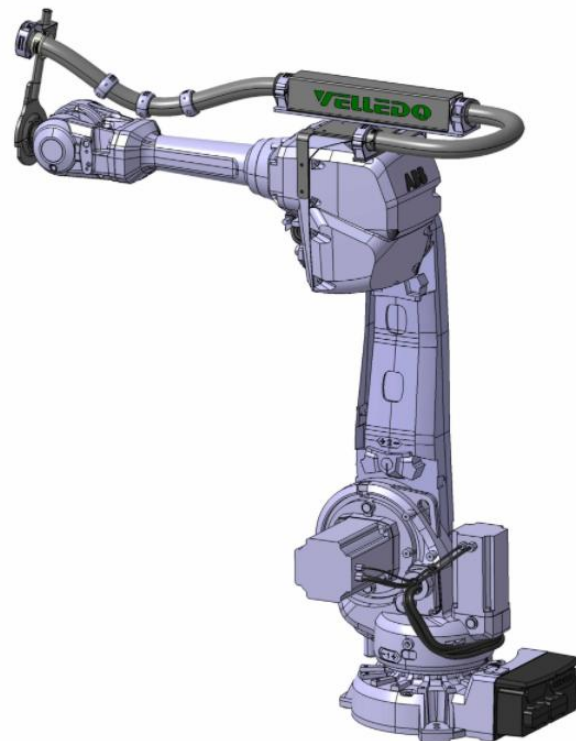
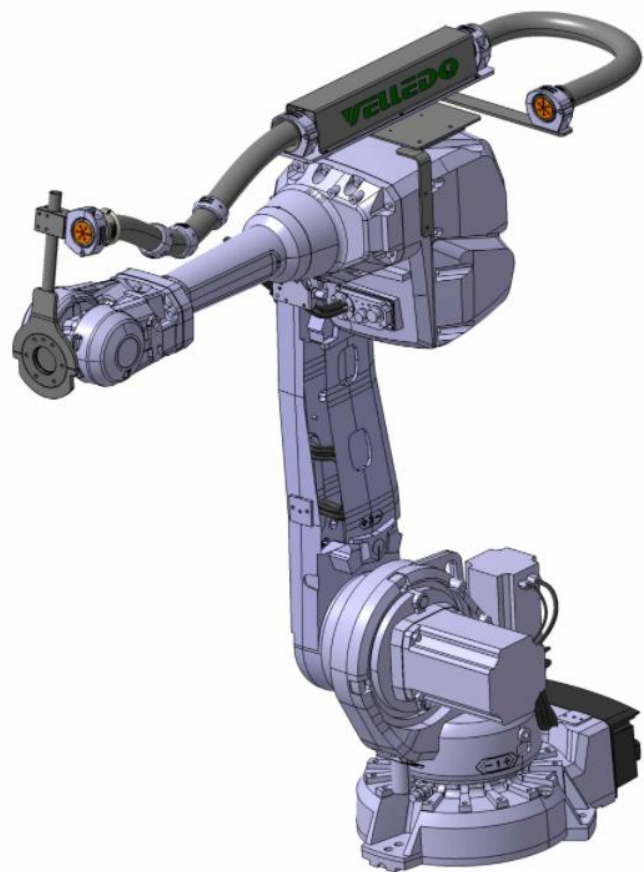
七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

13、ABB-IRB4600设计方案，管线包设计可采取3-6轴弹簧式的设计方案。

产品型号：ABB-IRB4600-60-205-D48-TH-3J-6J



Website: <http://www.velledq.com>

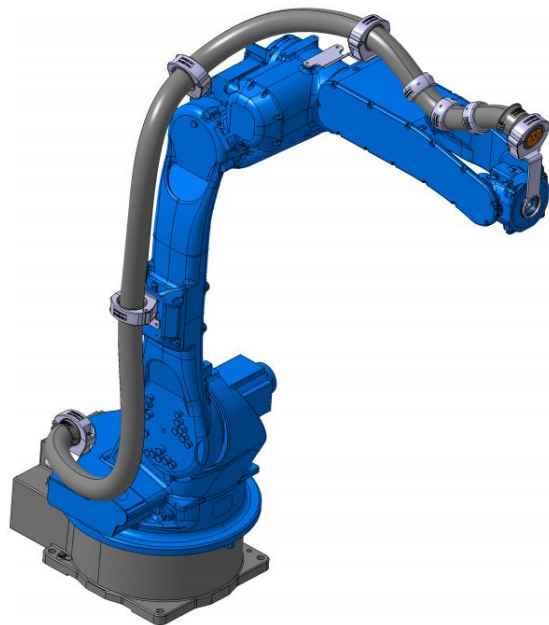
七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

15、YASKAWA-GP25设计方案，管线包设计可采取1-6轴挑高式的设计方案。

产品型号：YASKAWA-GP25-D48-TG-1J-6J



Website: <http://www.velledq.com>

七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

16、YASKAWA-GP35L设计方案，管线包设计可采取1-6轴挑高式的设计方案。

产品型号：YASKAWA-GP35L-D48-TH-TG-1J-6J



Website: <http://www.velledq.com>

七、设计方案

Design Scheme

VELLEDQ
— 为乐电气 —

17、YASKAWA-GP180-120设计方案，管线包设计可采取1-6轴挑高式的设计方案。

产品型号：YASKAWA-GP180-120-D48-TH-TG-1J-6J



Website: <http://www.velledq.com>

八、产品安装

Product installation



VELLEDQ为集成商提供机器人管线包对应的安装图。右图为示例。

CATIA 2D A3

序号	名称	图号	数量
1	1轴末端轴套	KR120-R2700-1J-BJ01	1件
2	1轴轴套	KR120-R2700-1J-BJ02	1件
3	1轴轴套	KR120-R2700-1J-BJ03	1件
4	3轴大轴套	KR01-D48-3J-BJ06	1件
5	3轴延长轴套	WL-YCBJ-D48-3J-BJ09	1件
6	罩盖护板	WL-D48-3J-HB04	1件
7	6轴支架(网味挡)	WQP140-12-D34-360	1件
8	固定块	WL-GDK-34	1件
9	弹簧	WL-R-Spring48	1件
10	阴阳螺丝	M12X50	4件

序号	名称	图号	数量
11	固定座	WL-D48-001	9件
12	定位环	WL-D48-002	3件
13	防撞球	WL-D48-003	5件
14	末端套筒	WL-D48-004	1件
15	前端套筒	WL-D48-005	1件
16	球形适配器	WL-D48-006	2件
17	活动瓦零件	WL-D48-007	1件
18	导向套筒	WL-D48-008	2件
19	分线器	WL-D48-009	2件
20	软管	WL-R-D48	6.5米

位置	长度
A-B	800
B-C	600
C-D	700
D-E	700
E-F	900
F-G	1000
G-H	520
G-K	1800
防撞球之间	150

1-6轴

弹簧伸缩, 48软管

KR120-R2700-D48-TH-1J-6J-0000

为乐电气(上海)有限公司



Website: <http://www.velledq.com>

九、 管线配套

Pipeline matching

VELLEDQ
— 为乐电气 —



工业智连系统服务商
企业官网/website: www.velledq.com

机器人管线包解决方案

VELLEDQ充分利用各类连接器、预铸线束、钣金机加工、塑料成型等生产资源，可灵活根据客户的成本预算，结合机器人在不同工况环境下的实际应用，为客户提供完整的管线包解决方案。VELLEDQ 管线包方案广泛匹配于KUKA、ABB、FANUC、安川、川崎等机器人品牌。



VELLEDQ充分利用各类连接器、预铸线束、钣金加工和塑料成型等生产资源，可以为客户提供完整成套的机器人管线包解决方案和售后安装调试服务。

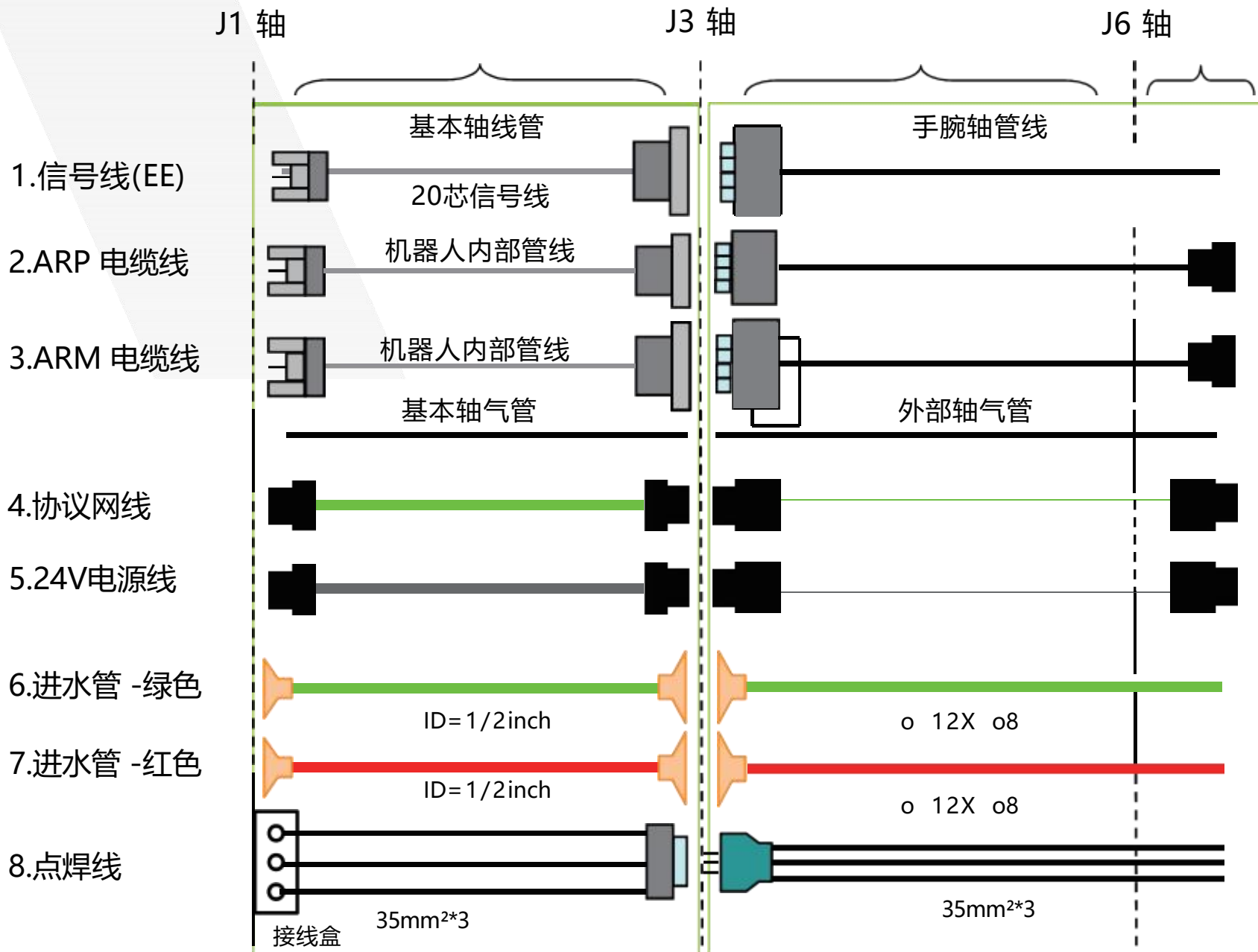


Website: <http://www.velledq.com>

十、电气连接

Electrical connection

VALLEDO
— 为乐电气 —



机器人3J-6J, 使用70款伸
缩弹簧



机器人1J-3J, 使用70款管线包



联系我们

Contact us

VELLEDQ
— 为乐电气 —



关注我们
Focuses on us



邮箱E~mail: VELLEDQ@VELLEDQ.COM



联系电话Tel: +86-21-62505095, 17321215055



企业官网Website: WWW.VELLEDQ.COM



微信Wechat: 为乐电气, VELLEDQ



地址: 中国上海市松江区书海路500号1号楼
Add: Building 1, No.500 Shuhai Road Songjiang District, Shanghai, China



Website: <http://www.velledq.com>



VELLEDO
— 为乐电气 —



**非常感谢
请多关照**