

# INTELLIGENT OFFICE OF THE STATE OF THE CHNOLOGY TECHNOLOGY TECH

Gorbel's G-Force® and Easy Arm® devices are part of an exciting new family of material handling equipment known as Intelligent Assist Devices (IADs). They use exclusive patented technology and an industrial processor controlled servo drive system to deliver unmatched lifting precision and speed. Their fusion of advanced technology and basic human guidance maximizes productivity while minimizing the risk of injury to the operator.

There are two models of Gorbel Intelligent Lifting Devices to choose from: the Q and the iQ. The Q model is our feature packed base model. It offers the same speed and precision as our higher-end iQ model, but without the added Input/Output features that the iQ offers. The iQ model offers a wealth of additional intelligence features.



Since 1977, Gorbel has specialized in overhead material handling solutions, providing the highest quality and the highest performance. We are the leading supplier of Work Station Crane systems, offering near perfect ontime delivery, a focus on customer service, and the industry's best warranty.

Now you'll find that same level of quality in our G-Force® and Easy Arm® Intelligent Lifting Devices. These innovative units enable operators to lift and maneuver naturally, as if the devices were an extension of their arms. Our Q and iQ model Intelligent Lifting Devices will help improve productivity, reduce the cost of product damage, and minimize work-related injuries.





한 브릿지 크레인 탑재 G-Force® 은 안전성, 생산성 및 품질을 향상시켜 작업 결과를 직접적으로 향상시킵니다.

#### CHOOSE A BRIDGE MOUNTED CRANE CONFIGURATION FOR:

- Higher capacities: 75, 165, 300, and 660 kg
- Faster speeds: maximum speeds up to 60m/min
- 뛰어난 반응성: 빠른 가속과 감속

#### **APPLICATIONS:**

- 자동화 장치 제조 (engines, transmissions, chassis components)
- 중장비 제조업
- 공구 및 다이 교체
- 천연 가스 및 석유 산업 (valves, drilling components, etc)
- 반복적인 리프팅
- 부품 조립
- 가공업
- 공정장비 유지 보수

#### **CASE STUDY**

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G-FORCE® Q: DAMAGE AND INJURY RISK "VIRTUALLY" ELIMINATED

**\*\*\*\*\*\*** 

Atlas Copco's
gas and process
division
makes turbo
compressors
and expansion
turbines that
are used for
natural gas
processing
and power

generation. At an assembly

facility where components for these large compressors are assembled, multiple work processes were sharing a single overhead crane system. Workers would often be at a stand-still while a co-worker used the crane, or would forgo the crane altogether and risk injury by lifting heavy parts by hand.

The company decided to target the highthroughput milling applications for a process change, and installed Gorbel work station cranes to eliminate the productivity delays caused by the shared crane. While the new cranes eliminated that problem, finding a lifting device to fit the application was a challenge due to the size of the load and the sensitive machinery it was being placed into.

In this work cell, 5-15" in diameter stainless steel cylinders that range from 15 to 400 pounds are milled down from bell shaped impeller blanks into the finished impeller with razor sharp edges. Moving the parts by hand posed multiple injury risks and a high potential for damage.

"We're lifting very heavy steel cylinders and trying to place them with precision into the milling machine without damaging the part or the machine," said Diehl. "We needed something that gave us a lot of control."

The company selected a 660 pound capacity G-Force<sup>®</sup> Q. Atlas Copco had considered other devices, but felt they would have the most control with the G-Force<sup>®</sup> after seeing a demo of the unit's virtual limits package, Float Mode feature, and overall smooth movement.

An operator now secures the impeller blanks into the tooling grip that Atlas Copco designed, which locks onto the blanks' outer rim. Once secured, the operator engages Float Mode on the G-Force® handle, and then moves the load up and down by holding the gripping tool or the load itself.





#### CHOOSE FREE STANDING EASY ARM® FOR:

- 최소 36cm 작업 반경 내의 협소한 공간에서도 설치 가능
- Capacities of 165, 330, and 660 lbs (75, 150, 330 kg)
- 간편한 설치
- 기초 공사 불필요
- 간편한 바닥 볼팅 작업으로 바닥 시공이 가능



#### **CASE STUDY**



EASY ARM® Q: INCREASES PRODUCTIVITY, LIFTS 5X AS MANY PARTS

**}}}}}** 

A major tier one auto parts supplier stamps round sheet metal blanks into clutch hubs and clutch housings for automatic transmissions.

transmissions.
The thin blanks
range in diameter from 6-14"
and weigh up to 8 pounds each.

They arrive in a bin and were manually loaded into the transfer press.

In order to load the blanks into the press, operators had to bend over the edge of the bin, grab as many blanks as they could hold, and then turn and carry them to the loading turn table. By the end of worker's shift, fatigue would set in and productivity would drop. Many workers complained of back strain and fatigue, while others suffered cuts to the hands, and wrist, plus elbow and shoulder pain.

After a new stamp press was installed, the company looked for a better handling solution. The company installed a 330 pound capacity Easy Arm® Q with an 8' span in the loading bay of their stamp press. The project integrator, Pressline Equipment, worked with Starquip of Ontario, Canada to design a pneumatic gripping tool that enabled operators to reach into the bin, grip about 150 pounds of blanks and effortlessly guide them into the spindles on the loading table. This is about 5-times as many blanks as they were able to lift manually. The result was faster cycle times, less worker fatigue, and no more productivity drop-off near the end of a shift.

"We were very pleased with the initial results," said the company's Environmental, Health & Safety Manager. "We had no more repetitive use injuries among Easy Arm® users, and workers are moving faster with less fatigue. We have older ladies who are able to do this job now with no problems. We wouldn't be buying a second unit if we had any doubts about it."

#### <<< Portable Base

Instead of bolting your free standing unit to the floor, our optional portable base gives you a stable base that you can move anywhere in your facility. The base shown is for smaller Easy Arms.

Larger units may require a different portable base. Contact your Gorbel dealer to learn more.





### Q AND IQ HANDLE CONFIGURATION OPTIONS

G-Force® 및 Easy Arm®은 핸들 구성에 유연성을 제 공하도록 설계되었습니다. Gorbel 대리점은 귀사의 어 플리케이션에 가장 적합한 핸들 구성을 선택할 수 있도록 도와 드릴 수 있습니다.

See tooling examples on pages 15-16.



#### In-Line Slide Handle

인라인 슬라이드 핸들을 사용하면 작업자가 하중에 가깝게 접근하여보다 정밀한 제어와 정밀성을 얻을 수 있습니다.이 손잡이로 작업자의 손동작과 함께 중량물이 움직입니다.



#### Remote Mount Slide Handle

슬라이드 핸들과 동일한 부드 러운 컨트롤을 제공하며 작업 자가 중량물에 가까이 가지 못 하는 경우에 유용합니다.



#### Suspended Pendant Control Handle

헤드 룸이 제한 되어있을 때, 작업자가 적재물에 접근 할 수 없거나 작업자가 중량물을 최 대로 들어올릴 때 이상적인 손 잡이 입니다.



#### Remote Mount Pendant Control Handle

핸들이 와이어 로프가 툴링에 부착되는 지점에서 1 피트 이 상 떨어져 있거나 리프팅 중에 하중이 튀거나 튀어 나올 것으 로 예상이 될 때 이 손잡이를 선택해 주십시오.



# FORCE SENSING HANDLES FOR G-FORCE® AND EASY ARM®

Force Sensing Handles는 인체 공학적으로 들어 올릴 수있는 다양한 기능을 제공합니다.상향 또는 하향 작동을 시작하기 위해 손잡이의 sensing을 사용하는 표준 슬라이드 손잡이에 비해 새로운 디자인은 손잡이 움직임없이 적용된힘을 감지합니다.

이로 인해 툴링을 위한 다목적 옵션이 생기거나 광범위한 모션이 있는 어플리케이션을 제공합 니다.



#### In-Line (FSI)

매우 낮거나 매우 높은 장소의중량 물을 옮길 때, 작업자가 몸을구<mark>부려</mark> 작업을 할 필요가 없습니다.



#### Hub (FSH)

다양한 핸들 바 (다른 핸들러)를 허 보에 장착 할 수 있으므로 맞춤형 툴 솔루션에 적합합니다.다양한 핸 들 바 (다른 핸들러)를 허브에 장착 할 수 있으므로 맞춤형 툴 솔루션에 가장 많은 유연성을 제공합니다.작 업자가 핸들 바 또는 허브에 부착 되 다른 제어 장치의 어떤 지점에 힘을가함으로써 위 / 아래 동작을 제어할 수 있습니다.

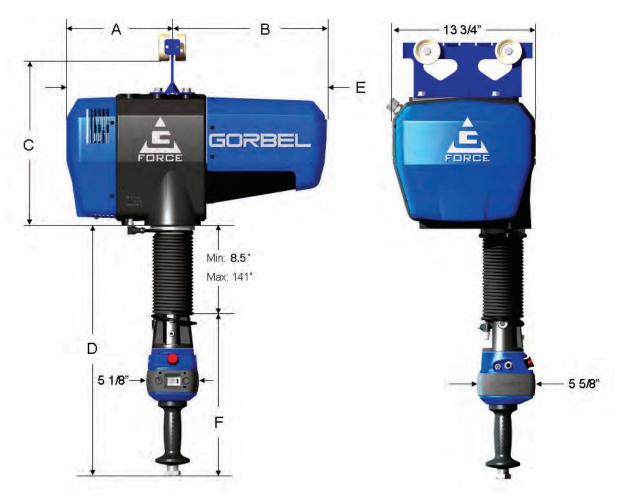


#### Remote mounted (FSR)

툴 프레임에 24 "또는 36"포스 센싱 핸들을 원격 장착 할 수 있습니다.

이 핸들은 인체 공학적으로 높고낮 은 위치에서 중량물을 옮기기 에 유용합니다.

#### G-FORCE® Q AND IQ: BRIDGE CRANE MOUNTED LIFTING DEVICE

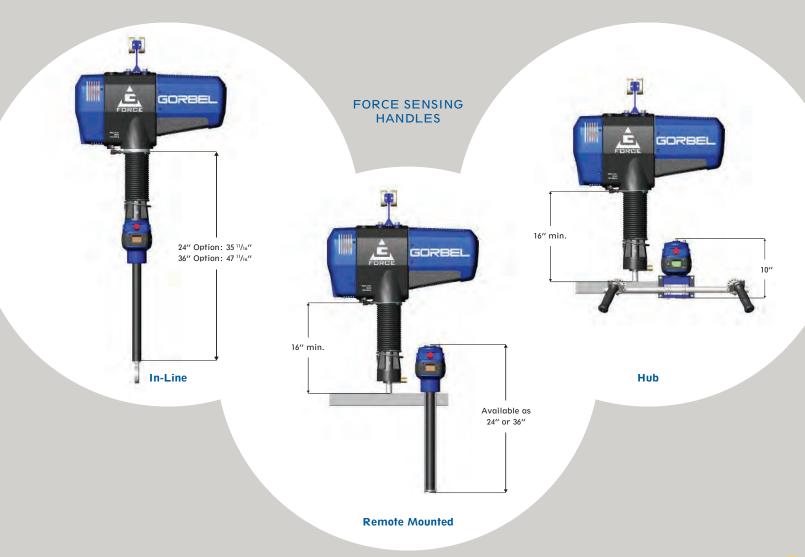


		330 lb (150 kg)	
А	8.625" (219mm)	10.25" (260mm)	10.25" (260mm)
В	14.375" (365)	15" (381)	15" (381)
С	17" (432)	17" (432)	17" (432)
D	<b>26''</b> (660)	26" (660)	26" (660)
Е	23" (584)	25.25" (641)	25.25" (641)
F	16" (406)	16" (406)	16" (406)

#### HANDLE CONFIGURATION OPTIONS



Dim			
D	17.5" (445mm)	8.5" (216mm)	17.5" (445mm)
F	14.25" (362)	14" (356)	14" (356)



# 660KG. UNIT HANDLE CONFIGURATIONS

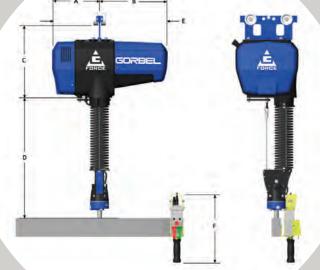


In-Line Slide



Remote Slide





Remote Pendant

Dim				
Α	10.25" (260mm)	10.25" (260mm)	10.25" (260mm)	10.25" (260mm)
В	15" (381)	15" (381)	15" (381)	15" (381)
С	17" (432)	17" (432)	17" (432)	17" (432)
D	30.5" (775)	21.5" (546)	21.5" (546)	17.5" (445)
E	25.25" (641)	25.25" (641)	25.25" (641)	25.25" (641)
F	19.5" (495)	14.25" (362)	14" (356)	14" (356)

#### **CASE STUDY**

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G-FORCE® Q: ERGONOMIC-FRIENDLY, INCREASES PRODUCTIVITY

**}}}}}** 

An international distributor of sustainable, environmentally friendly office space was looking to optimize the safety of its employees in high risk

applications. One of the first

areas targeted was the raw material receiving area, which handles incoming sheets of glass that are usually 3 feet by 6 feet, and weigh about 115 pounds. The sheets are brought in on large A frames, and moved onto carts where they go on to be framed.

Shipments are received a few times each week, and two workers are required to do as many as 80 lifts each shift. It was clear to the management very early that there was too much at risk to leave the application as it was.

"We had a few small injuries," said the manufacturing manager. "We did not have any back injuries yet, but it was coming. We didn't want to wait for it."

"A very similar application in another facility used a crane as well, but they had a chain hoist to lift the glass. It was very slow, not smooth enough, and operators didn't feel they had enough control to set the glass down gently. Eventually the workers pushed it off to the side."

For this facility, the company purchased a Gorbel G Force® Q with 330 pound lifting capacity and a remote mounted handle integrated with a Schmalz vacuum lifter. The tooling allows a single user to grip the sheet of glass and tilt it into position. The range of motion of the G Force® allows the users to maintain a fast working pace while still carefully placing each sheet of glass onto the carts. Since installing the G Force®, the management is very satisfied with the results, and the workers were also very happy to have the new lifting method.

"I am very happy with it," said one of the operators. "Especially on the larger pieces of glass, it saves us a lot of personnel time. We're able to run things a lot smoother, able to move from job to job and not worry about maneuvering the a frames because of the different sizes of glass."



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#### **>>>>>>**

#### EASY ARM® Q AND IQ: FREE STANDING LIFTING DEVICE



#### 165 LB (75 KG) UNIT

нин			6' (1829)			8′ (2438)					10' (3048)				
ОАН	109.14" (2772)			133.14" (3382)					157.14" (3991)						
А	33.84" (860)	45.12" (1146)	56.40" (1433)	67.68" (1719)	78.96" (2006)	33.84" (860)	45.12" (1146)	56.40" (1433)	67.68" (1719)	78.96" (2006)	33.84" (860)	45.12" (1146)	56.40" (1433)	67.68" (1719)	78.96" (2006)
В		10	)5.98" (269	92)		129.98" (3301)					153.98" (3911)				
С		9	7.89" (248	6)		121.89 (3096)			145.89" (3706)						
D	24.90" (632)	32.06" (814)	40.03"	48.00" (1219)	<b>56''</b> (1422)	24.90" (632)	32.06" (814)	40.03"	48.00" (1219)	<b>56''</b> (1422)	24.90" (632)	32.06" (814)	40.03"	48.00" (1219)	<b>56"</b> (1422)

#### 330 LB. (150 KG) UNIT

нин			6' (1829)			8′ (2438)					10' (3048)				
ОАН		10	9.88" (279	71)			13	33.88" (340	)1)			157.88" (4010)			
А	33.84" (860)	45.12" (1146)	56.40" (1433)	67.68" (1719)	78.96" (2006)	33.84"	45.12" (1146)	56.40" (1433)	67.68" (1719)	78.96" (2006)	33.84" (860)	45.12" (1146)	<b>56.40"</b> (1433)	67.68" (1719)	78.96" (2006)
В		10	06.86" (271	4)		130.86" (3324)					154.86" (3933)				
С		9	7.77" (248	3)		121.77" (3093)			145.77" (3703)						
D	24.34" (618)	32.26" (819)	42.70" (1085)	<b>51.48</b> " (1308)	<b>59.76"</b> (1518)	24.34" (618)	<b>32.26"</b> (819)	42.70" (1085)	51.48" (1308)	<b>59.76"</b> (1518)	24.34" (618)	32.26" (819)	<b>42.70"</b> (1085)	51.48" (1308)	<b>59.76"</b> (1518)

#### Please note:

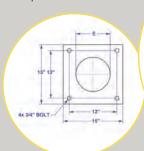
이 치수는 인라인 슬라이드 손잡이가있는 Easy Armll 장치 용입니다.팬던트 핸들 관련 치수는 문의 바랍니다.

#### 660 LB. (300 KG) UNIT

нин		6' (	1829)			8' (	2438)			10′ (	3048)	
ОАН		122"	(3099)			146"	(3708)			170"	(4318)	
А	45.12" (1146)	<b>56.4"</b> (1433)	67.68" (1719)	78.96" (2006)	45.12" (1146)	<b>56.4"</b> (1433)	67.68" (1719)	78.96" (2006)	45.12" (1146)	<b>56.4"</b> (1433)	<b>67.68"</b> (1719)	78.96" (2006)
В		114.22	" (2901)			138.22	<b>"</b> (3511)		162.22" (4120)			
С	94.39	(2398)	91.66	(2329)	118.39	(3007)	115.66	(2938)	142.39	(3617)	139.66	(3547)
D	40.1" (1019)	<b>50.1"</b> (1273)	60.1"	<b>70.1"</b> (1781)	<b>40.1"</b> (1019)	<b>50.1"</b> (1273)	<b>60.1"</b> (1527)	<b>70.1"</b> (1781)	40.1" (1019)	<b>50.1"</b> (1273)	<b>60.1"</b> (1527)	<b>70.1"</b> (1781)

#### **BASEPLATE DIMENSIONS**

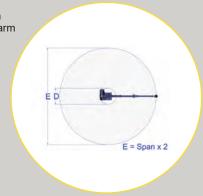
Please note: Hex baseplates are used on all 330 lb units, and on 165 lb units with a combined HUH plus span of 18' or more. All other 165 lb units use a quare baseplate.





#### HOOK COVERAGE

Arm Rotation: 355° primary arm 320° secondary arm



# TOOLING

#### EASE OF TOOLING INTEGRATION

#### GORBEL'S G-FORCE® TOOLING EXAMPLES

Q 및 iQ 모델은 금형 통합을 염두에두고 설계되었습니다. 옵션 핸들 보조 컨트롤 브래킷을 사용하여 공압식 밸브 또는 전기 스위 치를 G-Force® 컨트롤 핸들과 통합 할 수 있습니다. 아래의 핸들 구성 중 하나를 선택하십시오.













G-Force or Easy Arm iQ 모델을 위한

최고의 장치툴링의 완성 - 소프트 터치 조작 핸들

툴링을 직접 컨트롤 할 수 있는 에어 밸브입니다.

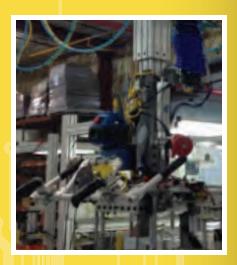
- 새로운 장비를 완성시키는 완벽한 디자인
- 핸들 교체의 편리성 합리적인 핸들 교체비용

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#### GORBEL'S G-FORCE® TECHNOLOGY: PROVEN PERFORMANCE

#### **ERGONOMIC STUDY**

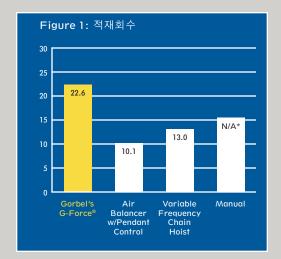
다음의 내용은 Rochester Institute of Technology 에서 수행한 연구를 기 반으로 합니다. Gorbel's G-Force® Intelligent Lifting Device를 다른 리프 팅 장치를 비교하였습니다.

전체 연구 내용은 http://www.gorbel.com/pdfs/study gforceergostudy.pdf를 참고하여 주시기 바랍니다.

#### **High Cycle Test**

Operators were:

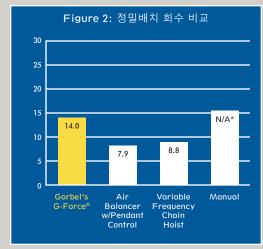
- 124% more productive with the G-Force $^\circ$ than with air balancers
- 74% more productive with the G-Force® than with variable frequency drive hoists



#### **Precision Placement Test**

Operators were:

- . 76% <sub>더 생산적</sub> 에어발란서보다
- . 59% 더 생산적 일반 호이스트보다

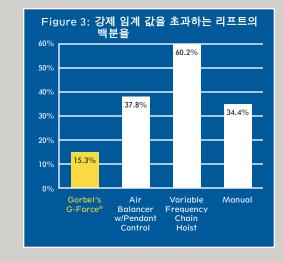


#### Force of Placement

The G-Force® was:

- 2.5X less likely to damage the load than the air balancer with pendant control
- 3.3X less likely to damage the load than the variable frequency drive hoists
- 2.2X less likely to damage the load than manual

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## GORBEL'S Q AND IQ TECHNOLOGY: TECHNICAL SPECIFICATIONS

#### BRIDGE MOUNTED G-FORCE® Q AND IQ QUICK FACTS

	Q	iQ	Q	iQ	Q	iQ	Q	iQ
Maximum Capacity	165	lb	330	lb	660	lb	132	0 lb
(Load & Tool)	75	kg	150	kg	300	kg	600	kg
Maximum Lifting Speed	200 ft/min		100 ft/min		50 ft/min		25 fpm	
Unloaded	61 m/min		30 m/min		14.94 m/min		7.47 m/min	
Maximum Lifting Speed	125 f	/min	75 ft	/min	42 ft	/min	21 1	pm
Fully Loaded	38 m	/min	23 m	/min	12.80 r	m/min	6.4 n	n/min
Maximum Float Mode	103 ft/min		65 ft/min		38 ft/min		19 fpm	
Lifting Speed	31 m	/min	20 m/min		11.58 m/min		5.79 m/min	
Maximum Lift Range	11	ft	11	ft	11	ft	5.5	i ft
Muximoni Lin Range	3.35	i m	3.3	ī m	3.35	5 m	1.6	8 m

#### FREE STANDING EASY ARM® Q AND IQ QUICK FACTS

	Q	iQ	Q	iQ	
Maximum Capacity (Load & Tool)	165 75	ib kg		lb kg	
Maximum Lifting Speed Unloaded		t/min <sub>l/min</sub>	90 ft/min 27 m/min		
Maximum Lifting Speed Fully Loaded		t/min <sub>/min</sub>	75 ft. 23 m		
Maximum Float Mode Lifting Speed		t/min <sub>l/min</sub>	65 ft. 20 m		
Maximum Lift Range		ft 5 m		f† 5 m	

#### Q AND IQ TECHNICAL SPECS

	Q	iQ
Primary Lift Voltage (VAC)	220 +	/- 10%
Maximum Current (Amps)	1	0
Duty Cycle	Н	15
Operating Temperature Range	41 - 1 5 - 5	
Operating Humidity Range (Non-Condensing)	35 -	90%
User Accessible Power	Not Available	
Virtual Limits (Upper Limit, Power Limit, Speed Reduction)	Standard	Standard

#### IQ SPECIFIC INFORMATION

I/O Actuator (iQ Only)	iQ
Number of Inputs, Type	8, Sinking
Input Current @ 24 VDC	6ma
Number of Outputs, Type	8, FET
Continuous Current/Channel (Amps)	0.5
Module Maximum Current (Amps)	0.5
Handle with I/O Module (iQ Only)	iQ
Number of Inputs, Type	8, Sinking
Input Current @ 24 VDC	4ma
Input Current @ 24 VDC  Number of Outputs, Type	4ma 8, FET



**OVERVIEW** 



#### **BRIDGE CRANES**









#### **ERGONOMIC LIFTING**



JIB CRANES



Ergonomic Study

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