Activelink Co starts offering the Powerloader Light Robot for R&D

【Overview】

We, Activelink Co Ltd are the Japanese company, based in Kyoto (President: Hiromichi Fujimoto) that developed the Power Amplification Robot for supporting High-weight operations called the POWERLOADER. Based on this development, we have recently developed a lighter version of the robot: The POWERLOADER Light (from now on referred as PLL) and will start commercializing it as a platform for hardware R&D from October 2010.

The PLL uses the same "Direct Force Feedback System" architecture for force control that was first applied during the development of the original PowerLoader. Within this architecture, the force magnitude and direction exerted by each foot is measured using the pedal attached 6-axis force sensors allowing the robot to follow naturally the motion of the operator legs and producing an augmentation of leg strength. According to current specifications, this augmentations can go up to 40kgf (around 400N)

Furthermore, the PLL has been designed to be able to be improved by the users so its software and hardware can be freely customized.

【Results】

As the tendency toward aging societies increases, there is great hope in power amplification robots. However in the current R&D market there is no Open Architecture Power Augmentation Robot in existence yet. Activelink Co has deemed that the necessity for a power amplification robot platform is indispensable with the goal to realize practical research on the field and therefore has started offering the PLL for Research purposes. We believe that our platform can contribute to education and R&D on diverse fields such as Rehabilitation, Robot Design, AI, BMI (Brain-Machine Interface), Man-machine interface and robot control among others.

【Characteristics】

The characteristics of the PLL for research are:

- ・ Designed to be improved by the target research institution
- ・ Non-wearable and Nonbinding leg mechanism makes it easy to use.
- ・ With a program for assisting R&D on PowerLoader research

【Contents】

Due to the non-existence of an open platform for R&D on Power augmentation robots, each research group had to develop their original hardware adapted to their research theme. Activelink Co has since its foundation in 2003, selected the necessary parts to achieve mechanisms that balance adequately actuator output, control circuit architecture, motor output, instrument weight, etc. Based on its experience developing continuously power augmentation robots our company has designed the PLL.

We believe that we can contribute to the advancement of R&D with practical applications by offering this platform. Furthermore we have established the "PowerLoader R&D Promotion Program" for institutions and people who open their research results in order to contribute to the advancement of R&D on power augmentation robots.

The specifications for the PLL for research are the following:

◆Basic Specifications

External dimension	Width 550mm x Depth 480mm x Height 1500mm
Weight	38kg
Material	Framework &Control BOX Aluminium
	Leg CFRP
	Pedal base NBR Rubber
Assist weight	40kg (Measured)
Bend cycle time	1.6 s
Range of motion	Hip Joint Front120° /Back 20°
	Knee Front 0° /Back 120°
	Ankle Up 45° /Down 45°
Motors	Main body EC-powermax30 200W 48V (maxon)
	Gear head GP32HP 8.0Nm 3ST 66:1(maxon)
	Encoder MR 1000 Count line dirver(maxon)
	Driver 4-Q-EC Amp DEC70/10 (maxon)
Joint axis reduction ratio	165:1
Assist Spring	Tension Spring(Material SWP-A dextral)
	Wire diameter 8mm external diameter 58mm turns 18
	Active length 152mm
	Initial tension 236N
	Spring constant 17.2N/mm
Pose detection	Optical 6-axis sensor OPFT-1kN-CH-B (Minevea)
Control PC	PentiumM 1.1GHz CPZ-D04PA11 RL (Interface)
Power suppy	AC100V or AC200V

The equipment comes with Linux 2.6 (plus the RT-Preempt patch) installed as the OS. It comes with a standard FA computer so the user has the option to install any other OS if desired (For installation services contact us)

【Price】

The official price of the PLL for Research (basic control software included) is 18 million yen (before tax). However, Activelink is offering an incentive of 9 million yen as part of our "Powerloader R&D Promotion Program" for clients who agree to open their research findings within a year of purchase and publish or present reproducible results within 3 years. With this program, the PLL can be purchased by 9 million 9 thousand yen (with taxes). Other options and color of the equipment can be requested as well.

【Powerloader R&D Promotion Program】

The Powerloader R&D Promotion Program is a unique assistance system established by Activelink Co to promote research that uses the PLL as a platform for open research on human strength assistance robots, power assist robots or power augmentation robots. The researchers who purchase the PLL have to agree to open their research findings within one year of purchase with as much detail as possible on online pages (research pages on academic institutions or personal weblogs) and to present reproducible results on conferences and online pages within 3 years.

Clients who agree with the above conditions won't be asked for credentials. The Promotion fund is up to 9 million yen. Ask your Activelink representative for details on how to apply for this program at the moment of purchase.

【References】　Activelink Co Ltd　　President: Hiromichi Fujimoto

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